



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: application of: Trung T. Doan

Serial No.: 09/133,989

Filed: August 14, 1998

For: CHEMICAL DISPENSING SYSTEM FOR
SEMICONDUCTOR WAFER PROCESSING

§
§ Group Art Unit: 1734
§
§ Examiner: Laura E. Edwards
§
§ Atty. Docket: 93-0421.03
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Charles B. Brantley II
Signature

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Respectfully submitted,

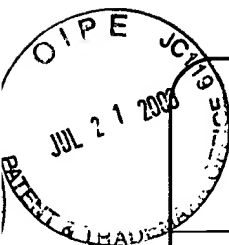
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☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$)

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Complete if Known

Application Number 09/133,989
Filing Date August 14, 1998
First Named Inventor Trung T Doan
Examiner Name Laura E Edwards
Art Unit 1734
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FEE CALCULATION

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Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description
1001	750	2001	375	Utility filing fee
1002	330	2002	165	Design filing fee
1003	520	2003	260	Plant filing fee
1004	750	2004	375	Reissue filing fee
1005	160	2005	80	Provisional filing fee

Fee Paid

SUBTOTAL (1)

(\$)

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
22	-22 **	0	0
Independent Claims	12	-12 **	0
Multiple Dependent			0

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	2204	42	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2)

(\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	320
1402	320	2402	160	Filing a brief in support of an appeal	
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,300	2453	650	Petition to revive - unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.224(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

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SUBTOTAL (3)

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SUBMITTED BY

Complete (if applicable)

Name (Print/Type) Charles Brantley Registration No. Attorney/Agent 38,086 Telephone 208-368-4557

Signature

Charles Brantley

Date

7/15/03

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Appendix 1: Copy of Involved Claims

Appendix 2: U.S. Pat. No. 5,178,989 by Heller

Appendix 3: *In re Zurko* 258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)

Appendix 4: *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 39 U.S.P.Q.2d 1573 (Fed. Cir. 1996)

Appendix 5: *Crown Operations Intl. v. Solutia, Inc.*, 289 F.3d 1367, 62 U.S.P.Q.2d 1917 (Fed. Cir. 2002)

Appendix 6: *Ex parte Herbermann*, 1997 WL 1935418 (Bd. Pat. App. & Interf. 1997)

- Appendix 7: *In re Oelrich*, 666 F.2d 578, 212 U.S.P.Q. 323 (C.C.P.A. 1981)
- Appendix 8: *United States Surgical Corp. v. Ethicon Inc.*, 103 F.3d 1554, 41 U.S.P.Q.2d 1225 (Fed. Cir. 1997), *cert. denied*, 522 U.S. 950 (1997)
- Appendix 9: *In re McLaughlin*, 443 F.2d 1392, 170 U.S.P.Q. 209 (C.C.P.A. 1971)
- Appendix 10: *In re Young*, 927 F.2d 588, 18 U.S.P.Q.2d 1089 (Fed. Cir. 1991)
- Appendix 11: U.S. Pat. No. 4,518,678 by Allen
- Appendix 12: U.S. Pat. No. 5,444,921 by Milina
- Appendix 13: *In re Carlson*, 983 F.2d 1032, 25 U.S.P.Q.2d 1207 (Fed. Cir. 1992)
- Appendix 14: *In re Dembiczak*, 175 F.3d 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999)
- Appendix 15: *In re Gartside*, 203 F.3d 1305, 53 U.S.P.Q.2d 1769 (Fed. Cir. 2000).
- Appendix 16: *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983)

APPLICANT'S BRIEF ON APPEAL

I. REAL PARTY IN INTEREST

The Applicant, Trung Doan, has assigned his interest in this application to Micron Technology, Inc.

II. RELATED APPEALS AND INTERFERENCES

U.S. Application Ser. No. 09/652,713, which was filed August 31, 2000 and is a divisional of the currently appealed application, has been forwarded to the Board of Patent Appeals and Interferences for decision on appeal.

U.S. Application Ser. No. 09/652,969, which was filed August 31, 2000 and is another divisional of the currently appealed application, has been forwarded to the Board of Patent Appeals and Interferences for decision on appeal.

III. STATUS OF THE CLAIMS

Claims 1-43 have been presented during prosecution of the application under appeal.

Claims 1-11 and 34-43 have been canceled.

Claims 12-33 are pending.

Claims 12-33 are rejected.

Claims 12-33 are appealed.

IV. STATUS OF THE AMENDMENTS

Applicant filed no amendments subsequent to final rejection.

V. SUMMARY OF THE INVENTION

The current invention addresses a chemical dispensing system for semiconductor wafer processing. One exemplary embodiment within the scope of the invention concerns a material removal system for a wafer, comprising a negative pressure device defining a vacuum area on more than one side of the wafer while that device is in an operational position. (Specification at p. 4, ln. 12-18; FIG. 2.) The system additionally comprises a solvent dispenser intersecting the vacuum area. (*Id.* at ln. 14-16; FIG. 2; *see also* p. 3, ln. 17-19.) The solvent dispenser is also aligned with an edge of the wafer while the device is in the operational position. (*Id.*) In a preferred embodiment of this type, the negative pressure device is distal from the wafer while the device is in the operational position. (*Id.* at FIGS. 1&2) Still other exemplary embodiments within the scope of the invention include but are not limited to a processor for a spin coating device, a bead remover for a wafer, an edge bead remover configured to service a spinning wafer, an edge bead removal system, a chemical dispensing system, a chemical remover for a substrate, and a profiler for a wafer.

VI. ISSUES

There are four issues for determination on appeal:

- 1) whether the Examiner has failed to establish anticipation in light of Honda;
- 2) whether the Examiner has failed to establish anticipation in light of Isono;
- 3) whether the Examiner has failed to establish obviousness in reliance on Kottman in combination with Honda; and
- 4) whether the Examiner has failed to establish obviousness in reliance on Uchida in combination with Honda.

VII. GROUPING

Applicant defines the following groups of claims for consideration upon this appeal. These groups correspond to the issues listed above.

Group I: claims 14, 22-29, and 31-33;

Group II: claim 28;

Group III: claims 12-13, 17-33 (the claims do not necessarily fall together); and

Group IV: claims 14-16.

VIII. ARGUMENT:

The Examiner rejected the appealed claims under either §102 or §103, citing various references for each statutory basis. Applicant addresses each reference or group of references cited against the claims separately below.

A. The Examiner has failed to establish anticipation under 35 U.S.C. §102

The Examiner rejected various groups of the pending claims as being anticipated by various references. Applicant addresses each basis for rejection separately below.

1. The Examiner has failed to establish anticipation in light of Honda

The Examiner rejected claims 14, 22-29, and 31-33 as being anticipated by Honda (Japanese Patent No. 08-005825). The Examiner's rejection, however, is premised on the assertion that Honda's developer is a solvent. (Office Action dated 2/13/03 at p. 2.) The Examiner acknowledges that Honda does not expressly indicate so, but the Examiner cites Fisch (U.S. Pat. No. 4,314,022) in an attempt to assert that Honda's developer is inherently a solvent. Applicant asserts that a careful reading of both references as well as other known art demonstrate that (a) the teachings relied upon by the Examiner are not inherent in Honda; and (b) the Examiner's attempts to refute Applicant's previously raised arguments against this rejection are untenable.

a) the teachings relied upon by the Examiner are not inherent in Honda

First, contrary to the Examiner's characterization of Honda's teachings, Applicant contends that Honda is not merely silent concerning whether its developer is a solvent. Rather, Honda expresses teachings that indicate its developer is not a solvent. As addressed in previous Responses, this is demonstrated by Honda's indication that the developer alone is insufficient to remove a resin from the substrate; additional processing is required. Specifically, Honda repeatedly teaches that the developer is to be applied before a subsequent developing process. (*See* Honda translation at p.1 last line- p. 2 ln. 1; p. 2 ln. 13-15; p. 3 ln. 32-33; p. 4 ln. 26.) Further, Honda teaches that, in the past, the developer and additional processing were still not necessarily enough to remove the resin. (*Id.* at p. 3 ln. 17-20.) Moreover, it is noteworthy that Honda discloses that the developer is placed over the entire substrate, which is then subjected to the additional processing. (*Id.* at p. 2, ln. 36-38; p. 4, ln. 26-27; p. 5, ln. 6.) If the developer was a solvent with respect to the resin, then it would automatically dissolve all of the underlying resin. This runs contrary to the teachings of Honda, which requires a certain pattern of resin to remain. Thus, given Honda's express indications that its developer is not a solvent, there can be no inherent teachings to the contrary for Fisch to reveal. Applicant contends that any attempt to apply Fisch in such a manner will merely highlight the contradictions between the two references and further refute the Examiner's attempted inherency argument.

In fact, the very Fisch excerpt cited by the Examiner demonstrates such contradictions between the two references. The Examiner cited Fisch's claim 5, which indicates that its developer affects both photoresist that has been exposed to light as well as photoresist that has not been exposed to light. Such developer behavior is in direct contradiction to Honda's developer, as addressed immediately above. To reiterate: Honda indicates that its developer does not affect photoresist that has been exposed to light; Honda further indicates that its developer may not even affect photoresist that has not been exposed to light. These conflicts, directed to the Examiner's very premise, indicate the inapplicability of Fisch's teachings to Honda and thereby demonstrate Fisch's inability to support teachings the Examiner deems to be inherent in Honda.

Such conflicts are explained by the fact that Fisch and Honda use their respective resists for fundamentally different reasons. Fisch's resist allows for patterning aluminum, while

Honda's resist provides a color filter. Such fundamental conflicts also further demonstrate Fisch's inability to support Honda's inherent teachings.

The Examiner's assumption concerning inherent teachings in Honda are further refuted by prior art expressly indicating that resist developer is not necessarily a solvent. Specifically, U.S. Pat. No. 5,178,989 by Heller indicates that the electrolyte concentration within a developer may be such that it cannot dissolve either exposed or unexposed resist. (Heller at col. 9, ln. 34-46.) Moreover, Heller details at least one other circumstance involving thermal crosslinking wherein a developer cannot dissolve either exposed or unexposed resist. (*Id.* at col. 17, ln. 34-37. Applicant has included Heller in an appendix to this Appeal Brief for the Board's convenience.)

Thus, the express teachings of Honda, Fisch, and Heller all demonstrate that there is inadequate support in the record suggesting that Honda's developer is inherently a solvent. As a result, the Examiner's attempted rejection based on Honda's inherent teachings is inconsistent with case precedent addressed earlier in prosecution. Specifically, Applicant cited *In re Zurko* (258 F.3d 1379, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001)) at page 5 of the Appeal Brief transmitted 5/6/02. (See also Response to the Office Action dated 8/1/02 at p. 3.) *Zurko* holds that the PTO "cannot simply reach conclusions based on its own understanding or experience." (*Id.* at 1697. A copy of *Zurko* is included in an appendix to this Appeal Brief.) Rather, the Court required that the PTO "point to some concrete evidence in the record" to support its findings concerning aspects of the relevant technology. (*Id.*) Applicant contends that, for the reasons described above, the "concrete evidence" required by binding case precedent is lacking in this case.

b) the Examiner's attempts to refute Applicant's previously raised arguments against this rejection are untenable

Applicant notes that the current Honda/Fisch rejection in the final Office Action is substantially the same as the Honda/Fisch rejection raised in the previous Office Action. (Compare the final Office Action dated 2/13/03 at p. 2 with the Office Action dated 8/01/02 at p. 3.) Accordingly, Applicant has previously presented these arguments. (Response to the Office Action dated 8/01/02 at p. 2-3.) As a result, the final Office Action contains a response to these

arguments. (Final Office Action dated 2/13/03 at p. 5-6.) Applicant alerts the Board that the Examiner's attempted response actually further refutes the rejection.

The Examiner begins the attempted response by acknowledging Applicant's argument that Honda and Fisch contradict to the point that Fisch cannot demonstrate Honda's inherent teachings. The Examiner responds by claiming that Honda and Fisch do not conflict. As support, the Examiner focuses on what the Examiner deems to be the general matters of the references. Applicant contends that, when the references are viewed as a whole, their conflicts as detailed above in part (1)(a) result in Fisch's failure to disclose teachings in Honda that the Examiner believes to be inherent. Moreover, the contradictions are significant to the extent that they are not cured by any general similarities between Honda and Fisch. To briefly reiterate: Honda deposits developer over the entirety of its resin-coated substrate. Thus, if Honda's developer is inherently a solvent, as the Examiner believes based on Fisch, then the developer would dissolve all of the resin. The result is that the resin could not be patterned, as required by Honda. Therefore, the Examiner's interpretation results in Honda being unable to achieve its own stated goal with its own material. Applicant reemphasizes that such a contradiction makes the Examiner's interpretation untenable.

The Examiner then addressed Applicant's citation to U.S. Pat. No. 5,178,989 by Heller, which Applicant cited to demonstrate that Honda's developer is not inherently a solvent. The Examiner's first complaint is that Heller is not used in the rejection. While true, Applicant contends that the Examiner's statement is insufficient to refute Applicant's citation of Heller. Applicant notes that prior art may be used to understand the technology and to help demonstrate how a disputed term is used by those skilled in the art. (*Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 39 U.S.P.Q.2d 1573, 1578 (Fed. Cir. 1996). A copy of this reference is included in an appendix to this Appeal Brief.) Thus, binding case precedent supports Applicant's citation to Heller to demonstrate that Honda's developer is not inherently a solvent and to provide guidance as to what developer actually is. Applicant's citation to Heller has the added benefit of anticipating the Examiner's requirement to support arguments under 37 C.F.R. §1.105. As a result, Applicant's citation to Heller helps streamline prosecution.

Curiously, the Examiner then admits that Heller provides even "more evidence that there are a multitude of developer compositions" that have different chemical characteristics, including solubility. (Final Office Action dated 2/13/03 at p. 5-6.) Applicant contends that the Examiner's

admission further supports the notion that Honda's reference to a developer does not inherently teach a solvent. Further, the Examiner's reference to "more evidence" indicates that there was already evidence in the record refuting the Examiner's inherency position, thereby making the Examiner's adherence to this rejection even more untenable.

Moreover, Examiner's suppositions in the current argument and response concerning how Honda's dispenser "can" act (*id.* at p. 2, 5) demonstrate a conflict with other case precedent. Specifically, the Federal Circuit has held that inherency cannot be established by probabilities or possibilities and that the "mere fact that a certain thing may result from a given set of circumstances is not sufficient" to establish the inherency of a teaching. (*Crown Operations Intl. v. Solutia, Inc.*, 289 F.3d 1367, 62 U.S.P.Q.2d 1917, 1923 (Fed. Cir. 2002) (citations omitted).) This Board has also echoed this rule. (*Ex parte Herbermann*, 1997 WL 1935418 at 4 (Bd. Pat. App. & Interf. 1997) (citing *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)). Copies of *Crown*, *Herbermann*, and *Oelrich* are included in appendices to this Appeal Brief.) As a result, the Board's reversal of the Examiner, withdrawal of the rejection, and allowance of the claims are still further supported.

2. The Examiner has failed to establish anticipation in light of Isono

The Examiner rejected claim 28 as being anticipated by Isono (Japanese Patent No. 2-157763). In support of the rejection, the Examiner interpreted Isono as disclosing a vacuum device that is spaced from the material to be dissolved during processing. (Office Action dated 2/13/03 at p. 3.) Applicant contends that a careful reading of Isono demonstrates that the Examiner has misinterpreted Isono and that Isono discloses only the exact opposite configuration.

In refuting previously raised §103 rejections based on Isono, Applicant has already pointed out to the Examiner that Isono clearly, expressly, and affirmatively discloses only a vacuum device that contacts its workpiece. (See Amendment and Response to the Office Action of 2/28/01 at p. 5; Appeal Brief transmitted 5/6/02 at p. 11-12.) Specifically, Applicant pointed out that Isono contains several instances referring to enclosing the edge of its substrate. (Isono translation at section entitled "Means to Resolve Problems," section entitled "Effects," and section entitled "Effectiveness of Invention;" *see also* the section entitled "Scope of Patent Application.") Isono also goes into further detail, describing how sealing plates seal the edges such that the substrate

edges are sealed off from the outer air. (*Id.* at p. 3, top ¶.) Isono's figure 1 further emphasizes this teaching. Applicant also directs the Board to page 4, lines 4-6 of the Isono translation, which indicates that Isono's device is configured to "hold and contain" the edge of the substrate.

Applicant submits that such disclosure refutes the Examiner's interpretation of Isono, and the resulting misinterpretation demonstrates the Examiner's failure to meet the *prima facie* burden for rejection. Moreover, Applicant contends that Isono discloses only the opposite of the Examiner's interpretation concerning vacuum device spacing; hence, the *prima facie* burden for rejecting claim 28 cannot be met relying on Isono.

As with the rejection addressed above in part (1), the current Isono rejection in the final Office Action is substantially the same as the Isono rejection raised in the previous Office Action. (*Compare* the final Office Action dated 2/13/03 at p. 2-3 *with* the Office Action dated 8/01/02 at p. 3-4.) Accordingly, Applicant has previously presented these arguments. (Response to the Office Action dated 8/01/02 at p. 4.) The current Isono rejection contains a brief addition, wherein the Examiner further highlights the attempted analogy between Isono's discharge port (element 6) to claim 28's vacuum device. (Final Office Action dated 2/13/03 at p. 3, 6 (referring to Isono's element 6 as a "conduit").) However, claim 28's vacuum device is required to be directed to a nozzle mentioned earlier in the claim. Examiner attempted to analogize Isono's supply hole (element 4) to that nozzle. Applicant contends that the Board's review of Isono, including Isono's FIG. 1, will reveal that Isono's discharge port (6) is not directed to Isono's supply hole (4) in the manner required by claim 28. Thus, the Examiner's amended argument in the Office Action still fails to render claim 28 anticipated.

B. The Examiner has failed to establish obviousness under §103

The Examiner rejected various groups of the pending claims as being obvious in light of various combinations of references. Applicant addresses each basis for rejection separately below.

1. The Examiner has failed to establish obviousness in reliance on Kottman in combination with Honda

The Examiner rejected claims 12-13 and 17-33 as being obvious in light of Kottman (U.S. Pat. No. 4,685,975) in combination with Honda. However, as mentioned previously during prosecution of these claims, every obviousness rejection requires that the multiple prior art references suggest to one of ordinary skill in the art to combine the references. (*See United States Surgical Corp. v. Ethicon Inc.*, 103 F.3d 1554, 1564, 41 U.S.P.Q.2d 1225, 1233 (Fed. Cir. 1997), *cert. denied*, 522 U.S. 950 (1997).) The Examiner must consider the references *as a whole*. (*In re McLaughlin*, 443 F.2d 1392, 170 U.S.P.Q. 209, 212 (C.C.P.A. 1971) (emphasis added).) Further, when the prior art contains conflicting references, the ability of each reference to suggest solutions to one of ordinary skill in the art must be considered. (*See In re Young*, 927 F.2d 588, 18 U.S.P.Q.2d 1089, 1091 (Fed. Cir. 1991).) Applicant contends that Kottman and Honda conflict to such an extent – in terms of both their general matters as well as the specific teachings relied upon by the Examiner – that one of ordinary skill in the art would be discouraged from combining their teachings.

a) Kottman and Honda conflict in terms of their main purposes

For instance, it is noteworthy that the main purpose and function of Honda is to make the time for developing the resin at the substrate edge equal to the time for developing the resin at the interior of the substrate. (Honda translation at ¶¶0007, 0011.) Honda achieves this by using concentrated developer at the substrate's edge to counteract its thicker resin. (*Id.* at ¶¶0006, 0007, 0011.) Because the substrate's edge is equally developed in comparison to the substrate's interior, it follows that the resin-removal process may be applied equally across Honda's substrate, with no need for a specially-configured cleaning device or methods for the periphery. (*See Id.* at ¶0007.) However, Kottman proposes just such a cleaning device and method. (Kottman at Abstract; col. 2, ln. 32-35; FIGS. 1, 7.) As a result, Honda teaches one of ordinary skill in the art that Kottman's devices, materials, and methods are unnecessary. Conversely, Kottman teaches one of ordinary skill in the art that Honda's techniques are unnecessary because Kottman's special treatment of the substrate's periphery eliminates the need for Honda's special

pre-treatment in that area. Thus, because each reference refutes the main purpose and function of the other, one of ordinary skill in the art would be discouraged from combining such references.

Applicant presented a similar argument against a previous rejection based on the Examiner's attempt to combine Honda and Matsumura (Japanese Pat. No. 5-175117). (*See* Appeal Brief transmitted 5/6/02 at p. 5-6.) The Examiner's subsequent withdrawal of that basis for rejection suggests that such arguments are persuasive. Applicant contends that the current argument presented above against the current rejection is analogous and therefore equally persuasive as the previous argument countering the previous rejection.

b). Kottman and Honda conflict in their particulars concerning treatment of the workpiece edge

The differences in Kottman's and Honda's handling of their respective workpieces and edge dispensers illustrate another conflict between the references. Specifically, Kottman teaches moving its workpiece periphery past a stationed solvent nozzle by rotating a circular workpiece around its center. (Kottman at Abstract; col. 2, ln. 32 - col. 3, ln. 4; FIGS. 1, 7.) Further, in the event the generally circular workpiece has a flat portion, Kottman teaches using a "cam action," suggesting that the wafer moves closer to the nozzle. (*Id.* at col. 6, ln. 7-32; FIG. 3.) Honda, on the other hand teaches keeping its rectangular workpiece stationary while moving the developer dispenser along the workpiece's periphery. (Honda translation at ¶¶ 0004, 0006; FIG. 2.) Moreover, Honda teaches this technique for edge dispensing despite acknowledging other dispensing methods wherein the workpiece is rotated. (*Id.* at section entitled "Makeup" and at ¶¶ 0003, 0008.) Further, Honda even uses such a method for dispensing another material in another location. (*Id.* (referring to spinning-on resist).)

Thus, both references address generally moving a workpiece during processing and particularly rotating a workpiece around its center. However, Honda appears to one of ordinary skill in the art to reject applying that technique while treating the edge of its workpiece, whereas Kottman embraces that technique while treating the edge of its workpiece. As a result, each reference teaches the opposite of and therefore away from the other's edge treatment technique.

Further, both references address treating the straight edge of a workpiece. (*Compare* Honda translation at ¶ 0004 (describing a rectangular substrate) *with* Kottman at col. 6, ln. 7-32 and FIG. 3 (describing a flat portion of a wafer).) However, Kottman teaches moving the workpiece relative to a stationary nozzle to effectuate edge treatment (Kottman at col. 6, ln. 7-32 (describing “cam action”)), whereas Honda teaches moving the nozzle relative to a stationary workpiece to effectuate edge treatment. Thus, once again, each reference is in direct conflict with the other.

As a result, one of ordinary skill in the art would interpret each of Kottman and Honda as rejecting the relevant techniques of the other. Such conflicts provide another instance that would discourage the ordinary artisan from combining these references.

c) Kottman and Honda conflict in their particulars concerning applying suction at the workpiece edge.

The use of suction to remove edge beads or lack of reference thereto provides yet another conflict between the references. Honda expressly requires drawing in air with a vacuum suction part of its device while another part of its device drips developer onto the substrate. (Honda translation at ¶ 0006; FIG. 3.) Kottman is clearly aware of suction technology, as demonstrated by its use of a vacuum to hold the workpiece to a chuck. (Kottman at col. 1, ln. 30-35; col. 4, ln. 33-43; col. 5, ln. 16-17, 30-33; col. 6, ln. 62.) However, the Examiner admitted that Kottman neither teaches nor suggests the use of suction for edge bead removal. (Office Action dated 2/13/03 at p. 3.) Nevertheless, the Examiner argued that one of ordinary skill in the art would be motivated to modify Kottman by including a suction mechanism for edge bead removal in the interest of facilitating that removal. Applicant contends that Kottman’s acknowledgement of suction techniques in general yet silence concerning applying those techniques directly to edge bead removal would be interpreted by the ordinary artisan as Kottman rejecting the direct application of suction techniques to its edge bead removal.

This contention is further supported by the fact that Honda does not appear to rotate its substrate while applying its develop, as addressed above. (Honda translation at ¶¶ 0004, 0006; FIG. 2.) Rather, Honda indicates that its substrate is stationary while the dispenser moves along the periphery. (*Id.*) Thus, other than that suction, Honda discloses no force that would assist in

removing the developer during edge treatment. Kottman, on the other hand, does disclose an alternative force that one of ordinary skill in the art could use for removing its solvent – namely the centrifugal force present during solvent dispensing. (Kottman at Abstract; col. 2, ln. 29, 62-66; col. 7, ln. 24-32; col. 9, ln. 45-59.) Thus, with such a force present, one of ordinary skill in the art would view modifying Kottman to include a suction mechanism for edge bead removal as adding unnecessary redundancy given that edge bead removal is already facilitated by the presence of centrifugal force during solvent dispensing.

Other references cited during prosecution of these claims support Applicant's contention. For example, U.S. Pat. No. 4,518,678 by Allen, in a manner analogous to Kottman's teachings, (1) acknowledges suction techniques by using that technique to secure its wafer (Allen at col. 3, ln. 4-16; col. 4, ln. 10); (2) teaches dispensing an edge bead solvent onto a spinning wafer (*id.* at col. 4, ln. 15-23); (3) expressly acknowledges the contribution of centrifugal force in dispensing the solvent (*id.* at col. 3, ln. 68); and (4) lacks disclosure concerning the use of suction to directly assist in edge bead removal. Instead, Allen expressly teaches removing the solvent using "centrifugal forces, i.e., a centrifuging action" by increasing the rotation speed not just once, but twice in its process. (*Id.* at col. 4, line 43 - col. 5, ln. 5; FIG. 1.) Allen further expressly discloses a drain (element 30) for the coating process. (*Id.* at col. 3, ln. 4-16; Fig 4.)

Similarly, U.S. Pat. No. 5,444,921 by Milina acknowledges suction techniques by using that technique to secure its wafer (Milina at col. 1, ln. 12-25); teaches dispensing an edge bead solvent onto a spinning wafer (*id.* at col. 1, ln. 50 - col. 2, ln. 25); and lacks disclosure concerning the use of suction to directly assist in edge bead removal. Instead, Milina discloses a drain (element 26) for collecting excess fluid during operation of the system. (*Id.* at col. 4, ln. 29-31; FIG. 1. Copies of Allen and Milina are included in appendices to this Appeal Brief.)

One of ordinary skill in the art is deemed to know of these references. (*In re Carlson*, 983 F.2d 1032, 1038, 25 U.S.P.Q.2d 1207, 1211 (Fed. Cir. 1992). A copy of *Carlson* is included in an appendix to this Appeal Brief.) Applicant contends that such knowledge will affect the artisan's perceptions of Kottman and motivations to modify Kottman's teachings. Specifically, the artisan will appreciate that when Kottman's edge bead solvent is applied, centrifugal force is already present, and that Kottman expressly acknowledges vacuum techniques yet refrains from directly applied those techniques edge bead removal. Guidance from Allen and Milina will discourage spending time, money, effort, and complication of machinery involved with sucking the dispensed

liquid, as required by Honda. Rather, such references will motivate the artisan to use the already present centrifugal forces to facilitate edge bead removal.

Thus, the conflict between Kottman and Honda concerning edge bead removal, as demonstrated by those references as well as others known to one of ordinary skill in the art, provide yet another instance that would discourage such an artisan from combining Kottman and Honda.

d) Kottman and Honda conflict in their particulars concerning nozzle configuration

The Examiner's Kottman/Honda rejection is also premised on the assumption that Kottman's illustration of a dispenser below its wafer and Kottman's text concerning its dispenser above the wafer make obvious a configuration wherein a dispenser is above the wafer while another dispenser is below the wafer. (Office Action dated 2/13/02 at p. 3-4.) Kottman's FIG. 1 does disclose a nozzle under a wafer. However, the particular text cited by the Examiner states

[f]urther, nozzle **59** (FIG. 7) can be located adjacent surface **30**, i.e., above the wafer **26** for applying fluid for dissolving the resist to the portion of surface **30** adjacent edge **32**.

(Kottman at col. 5, ln. 62-65 (emphasis in original).) Applicant contends that, at best, this language supports relocating nozzle 59 from a position below the wafer to a position above the wafer. Nothing in this portion of cited text suggests the Examiner's proposition of providing one dispenser analogous to nozzle 59 above the wafer and another dispenser analogous to nozzle 59 below the wafer simultaneously. As a result, Kottman conflicts with Honda's FIG. 2, thereby further discouraging one of ordinary skill in the art from combining their teachings.

Additional problems with combining Kottman arise when the Examiner's cite is considered in the broader context of Kottman's disclosure as a whole. Although the Examiner's cited excerpt appears to encourage a resist solvent nozzle above Kottman's wafer, Kottman appears to strongly discourage such embodiments in at least two other instances. In the first instance, Kottman addresses spraying solvent on a spinning wafer's periphery from a nozzle under the wafer. (Kottman at col. 6, ln. 7-31.) In this case, the wafer is not completely circular; rather, there is a flat portion. (*Id.*; FIG. 3.) Kottman warns that, if the wafer's general position remains stationary, then

there will be times when the when the truncated portion of the wafer (corresponding to the flat area) will fail to block the solvent spray; as a result, the wafer's top surface will be undesirably sprayed. (*Id.*) To avoid this occurrence, Kottman provides the "cam action" addressed above. (*Id.*) In another example, Kottman warns that under certain circumstances, attempting to apply resist solvent to the bottom of a wafer may result in excess solvent that contaminates the wafer's upper surface. (*Id.* at col. 8, ln. 50 - col. 9, ln. 4; FIG. 10.) To avoid this occurrence, Kottman provides an overflow mechanism. (*Id.*) Such conflicting teachings within the same reference indicate that there is no clear direction in the art in general or in this reference in particular, thereby countering the Examiner's purported motive for combination. Moreover, the schizophrenic nature of Kottman's disclosure calls into question the ability of one of ordinary skill in the art to combine Kottman's teachings with any other reference, including Honda.

Thus, the conflicts between Kottman and Honda (as well as the conflicts within Kottman itself) concerning nozzle configuration provide still another instance that would discourage such an artisan from combining Kottman and Honda.

e) Kottman and Honda conflict in their particulars concerning nozzle orientation

The Examiner's Kottman/Honda rejection is further premised on the assumption that, in light of Honda, it would be obvious to modify Kottman's edge dispenser 55 from an orientation that is non-perpendicular with respect to the wafer to one wherein Kottman's nozzle is perpendicular to the wafer. (Office Action dated 2/13/03 at p. 4.) Applicant contends that Kottman's own disclosure as well as other references known to one of ordinary skill in that art would discourage this modification and the Kottman/Honda combination in general. Significantly, Kottman itself discloses another dispenser -- outlet 65 -- that is perpendicular with the wafer over its center. The fact that Kottman acknowledges one dispenser perpendicular to the wafer yet provides an edge dispenser 55 that is non-perpendicular to the wafer suggests to one of ordinary skill in the art that Kottman has rejected a perpendicular orientation for its edge dispenser 55. Other references that were cited during prosecution and would be known to one of ordinary skill in the art also disclose a non-perpendicular edge dispenser. Figure 4 of Allen, for example, generally illustrates a nozzle assembly 40 that is non-perpendicular to substrate 10 and configured to

dispense a solvent (*id.* at col. 4, ln. 2). Allen's figure 5 further details the nozzle assembly 40, and the related text indicates that nozzle 50 defines a non-perpendicular angle with substrate 10. (*Id.* at col. 3, ln. 22-31.) Allen further specifies that nozzle 50's positioning with respect to substrate 10 is "important." (*Id.* See also U.S. Pat. No. 5,289,222 by Hurtig at col. 1, ln. 48-57; FIG. 2 (describing and illustrating an edge bead removal nozzle 104C that is non-perpendicular with wafer 103); Isono at FIG. 1, element 4.) Such emphasis from art that an ordinary artisan would be aware of suggests that there is a reason in the art for the non-perpendicular orientation of an edge dispenser. The art's emphasis further suggests that altering that orientation would not be an obvious design choice but would in fact implicate an "important" factor in edge bead removal.

As a result, the express teachings in Kottman itself as well as other art known to an ordinary artisan suggest the intentional nature of the orientation Kottman's solvent dispenser 55 as well as the rejection of a perpendicular orientation therefor. Such express language in the art also refutes the Examiner's conclusion concerning obvious design choices. Moreover, Kottman's rejection of a perpendicular edge dispenser 55 would further be seen by one of ordinary skill in the art as a conflicting teaching with Honda's nozzle 12, thereby further discouraging their combination.

Thus, when Kottman and Honda are considered as a whole, including their conflicting teachings, one of ordinary skill in the art will appreciate that the references are incompatible on every level ranging from their general teachings to their specific devices and techniques. Hence, the ordinary artisan would be actively discouraged from their combination in general and the Examiner's proposed modifications in particular.

f) The Examiner has improperly relied on "obvious design choice" to justify combining Kottman and Honda

As with the rejections addressed above in part (A), the Kottman/Honda rejection in the final Office Action is substantially the same as the Kottman/Honda rejection raised in the previous Office Action. (*Compare* the final Office Action dated 2/13/03 at p. 3-4 *with* the Office Action dated 8/01/02 at p. 4-5.) Accordingly, Applicant has previously presented the arguments in parts (B)(1)(a)-(e). (Response to the Office Action dated 8/01/02 at p. 5-11.) However,

Applicant's further review has revealed another problem with the rejection. In the last paragraph of the rejection, the Examiner addresses the topic of "each solvent dispensing nozzle being perpendicular to the wafer." (Final Office Action dated 2/13/03 at p. 4) The Examiner indicates that Honda discloses that orientation. (*Id.*) The Examiner immediately concludes that "one of ordinary skill in the art would have found it *obvious as an engineering design choice* to make each [of Kottman's] solvent nozzle[s] perpendicular to the wafer." (*Id.* (emphasis added).) Applicant contends that the Examiner's reliance on what is deemed to be "obvious as an engineering design choice" is in contradiction with binding case precedent.

In *In re Dembiczak*, the Federal Circuit reviewed the Board's analysis used to uphold the obviousness rejections. (*In re Dembiczak*, 175 F.3d 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999), *abrogated on other grounds by In re Gartside*, 203 F.3d 1305, 53 U.S.P.Q.2d 1769 (Fed. Cir. 2000). Copies of *Dembiczak* and *Gartside* are included in an appendix to this Appeal Brief.) The Federal Circuit noted that the Board conducted a reference-by-reference, limitation-by-limitation analysis, but when it came to articulating the motive for combining the references, the Board merely announced that the modification was an "obvious design choice." (*Id.* at 1618 (citing p. 24 of the Board's slip opinion).) The Federal Circuit began its review by emphasizing that the key to analyzing an obviousness rejection is to consider what would be obvious "at the time the invention was made." (*Id.* at 1616.) That phrase, the Federal Circuit noted, "guards against entry into the tempting but forbidden zone of hindsight." (*Id.*) The Federal Circuit added that phrase

requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field.

(*Id.* at 1617.) To do otherwise, continued the Federal Circuit, "may prompt one 'to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.'" (*Id.* (citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)). A copy of *Gore* is included in an appendix to this Appeal Brief.) The Federal Circuit emphasized that "the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine the prior art references."

(*Dembiczak*, 50 U.S.P.Q.2d. at 1617.) The Federal Circuit indicated that, without such a showing, combining the references “simply takes the inventor’s disclosure as a blueprint for piecing together the prior art to defeat patentability,” which is “the essence of hindsight.” (*Id.*) The Federal Circuit also noted that articulating a suggestion, teaching, or motivation to combine provides additional benefits, including

(1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of review on appeal.

(*Id.*) In applying this reasoning to the facts in *Dembiczak*, the Federal Circuit found that the Board “fell into the hindsight trap.” (*Id.*) Specifically, the Federal Circuit ruled that the Board’s justification of modifying one prior art reference based on the teachings of another as an “obvious design choice” failed to demonstrate actual “clear and particular” evidence of motivation to combine. (*Id.* at 1617-18.)

The current facts are analogous to those in *Dembiczak*. Specifically, the Examiner’s justifying the modification of Kottman’s edge dispenser to a perpendicular configuration proposed in Honda to be “obvious as an engineering design choice” evokes the “obvious design choice” language used by the Board in *Dembiczak*. The similarity in the bases for rejection indicates that the Examiner has fallen into the same hindsight trap as did *Dembiczak*’s Examiner and Board. As a result, the reversal of the Examiner is warranted for the same reasons articulated by the Federal Circuit in *Dembiczak*.

As for the extent of the reversal warranted by the Examiner’s error, Applicant contends that any of the conflicts presented above in parts (B)(1)(a)-(e) are sufficient to demonstrate that the Examiner failed to review the art as a whole and instead improperly relied on hindsight. As a result, the Board’s withdrawal of the rejection against all of claims 12-13 and 17-33 is justified. Moreover, any of those conflicts discourage combining Kottman/Honda, thereby further supporting the Board’s withdrawal of the Kottman/Honda rejection against all of those claims. Hence, the Examiner’s attempt to rely on “obvious design choice” to justify one of the conflicts (modifying Kottman’s edge dispenser to a perpendicular configuration à la Honda) is sufficient to withdraw the rejection against all of claims 12-13 and 17-33. At the very least, the faulty “obvious design choice” reasoning is sufficient to withdraw the rejection of claims 29-33, which

expressly require a dispenser that is perpendicular to a wafer. As a result, the claims do not necessarily fall together.

g) The Examiner's attempts to refute Applicant's previously raised arguments against this rejection are untenable

Because Applicant has previously presented arguments in (B)(1)(a)-(e) above, the final Office Action contains a response to these arguments. (Final Office Action dated 2/13/03 at p. 6-8.) Applicant contends that the Examiner's response is insufficient to refute Applicant's arguments and actually further supports the Board's withdrawal of the rejections.

In addressing Applicant's point that Kottman and Honda conflict in terms of their main purposes (*see* part (B)(1)(a) above), the Examiner interpreted Applicant's statements as arguing the references' intended use with respect to the structural limitations set forth in the appealed apparatus claims. (Final Office Action dated 2/13/03 at p. 6.) Applicant alerts the Board that the Examiner has misinterpreted Applicant's argument. Applicant is not arguing the references' intended use with respect to the structural limitations set forth in the appealed apparatus claims. Rather, Applicant is arguing Kottman's intended use with respect to Honda's intended use. The conflicts between their intended uses, as well as other conflicts between their teachings, discourage one of ordinary art from combining their teachings. Hence, the obviousness rejection fails without Applicant having to address the structural limitations of the appealed claims.

The Examiner then purports to address Applicant's point concerning "how Kottman treats the substrate is different from that of how Honda treats the substrate." (Final Office Action dated 2/13/03 at p. 6-7.) Applicant presumes that the Examiner is responding to Applicant's arguments re-presented in parts (B)(1)(b) and (c) above. The Examiner's specific response is that "[r]egardless of how Kottman and Honda handle the wafer," such teachings do not affect the specific modification proposed by the Examiner. (Final Office Action dated 2/13/03 at p. 7 (emphasis added).) Applicant contends that the Examiner's express disregard for (1) the general teachings in Kottman and Honda outside of those purportedly needed to support rejection; and (2) the specific contradictions in those teachings both demonstrate the Examiner's failure to comport with several instances of binding case precedent. First, the Examiner's admission demonstrates a failure to consider the references *as a whole*. (*See McLaughlin*, 170 U.S.P.Q. at 212 (emphasis added).) Second, the Examiner's admission demonstrates a failure to consider the ability of each

reference to suggest solutions to one of ordinary skill in the art when the prior art contains conflicting references. (See *Young*, 18 U.S.P.Q.2d at 1091.) Further, the Examiner's ability to ignore the legion of contradictions between the teachings of Kottman and Honda and focus solely on particular excerpts that purportedly support an obviousness rejection further support the notion that the Examiner has fallen "into the hindsight trap" – having inappropriately used hindsight gained from the current invention in order to focus on particular points of prior art. (See *Dembiczak*, 50 U.S.P.Q.2d. at 1617.)

The Examiner subsequently addresses Applicant's citation to the Allen and Milina references. (See (B)(1)(c) above.) The Examiner attempted to downplay their relevance by characterizing them as being "merely . . . more patents directed toward edge bead removal." (Final Office Action dated 2/13/03 at p. 7.) Applicant alerts the Board that Allen and Milina are cited to refute the Examiner's assumption that one of ordinary skill in the art would be motivated to modify Kottman's device to use suction to remove edge bead solvent. Specifically, Allen and Milina, like Kottman, (1) acknowledge suction techniques for other applications in their devices yet (2) lack disclosure concerning applying suction techniques for edge bead solvent removal; instead, those references (3) offer alternative techniques for edge bead solvent removal. Allen specifies that a spinning wafer's centrifugal force removes solvent; Milina also teaches a spinning wafer as well as a drain for collecting fluid; Kottman also teaches the centrifugal force of a spinning wafer. Thus, one of ordinary skill in the art would be aware of Allen and Milina (*Carlson*, 25 U.S.P.Q.2d at 1211); Allen and Milina help in understanding the relevant technology (*Vitronics*, 39 U.S.P.Q.2d at 1578); and Allen and Milina bolster the teachings of Kottman, thereby demonstrating that a significant portion of the relevant art contradicts the teachings in Honda, a factor the Examiner is legally bound to consider (*Young*, 18 U.S.P.Q.2d at 1091). As a result, Applicant contends that the citation to Allen and Milina in the Kottman/Honda rejection is proper and relevant; and what is moot is the Examiner's statement that Allen and Milina are not part of the rejection.

The Examiner then argues that such teachings do not actually contradict Honda's – that the absence of disclosure in Kottman concerning applying suction techniques for edge bead solvent removal cannot be interpreted as contradicting Honda. Applicant contends that one of ordinary skill in the art would not interpret Kottman, as well as Allen and Milina, to be merely silent on this subject and amenable to any modification. Rather, as detailed above in part (B)(1)(c), the ordinary artisan would note that those references actively teach the application of suction technology in

other circumstances. In light of such active teaching, an ordinary artisan would find curious their silence concerning applying this technology to solvent removal circumstances. This curiosity might be resolved, however, given that Kottman, Allen, and Milina expressly provide alternatives for solvent removal that eliminate the need for the modification envisioned by the Examiner. Hence, Kottman's silence in the context of its relevant active teachings carry implications that would discourage one of ordinary skill in the art from the Kottman/Honda combination in general and the Examiner's modification in particular.

The Examiner then purported to address Applicant's points concerning the conflicts between Kottman and Honda in terms of their nozzle configuration and orientation (re-presented in parts (B)(1)(d) and (e) above). The Examiner's specific response is that "*regardless* of the Kottman nozzle configuration or orientation," such teachings do not affect the specific modification proposed by the Examiner. (Final Office Action dated 2/13/03 at p. 8 (emphasis added).) Applicant contends that the Examiner's repeated express disregard for (1) the general teachings in Kottman and Honda outside of those purportedly needed to support rejection; and (2) the specific contradictions in those teachings once again demonstrate the Examiner's failure to comport with case precedent. (*See McLaughlin*, 170 U.S.P.Q. at 212 (requiring the Examiner to consider the references as a whole); *Young*, 18 U.S.P.Q.2d at 1091 (requiring the Examiner to consider the ability of each reference to suggest solutions to one of ordinary skill in the art when the prior art contains conflicting references); and *Dembiczak*, 50 U.S.P.Q.2d. at 1617 (requiring the Examiner to avoid falling into the "hindsight trap").)

2. The Examiner has failed to establish obviousness in reliance on Uchida in combination with Honda

The Examiner rejected claims 14-16 as being obvious in light of Uchida (Japanese Patent No. 56-073579) in combination with Honda. Significantly, the Examiner has attempted to cite this combination throughout the prosecution of this application. (Office Action dated 3/21/00 at p. 5-6; Office Action dated 9/6/00 at p. 3-5; Office Action dated 2/28/01 at p. 4-6; Office Action dated 11/19/01 at p. 2-3; Office Action dated 8/01/02 at p. 5-6.) Accordingly, Applicant has previously argued against this combination. (First Amendment and Election in Response to the Office Action of 3/21/00 at p. 7-8; Amendment in Response to the Office Action of 9/6/00 at p. 9-10;

Amendment and Response to the Office Action of 2/28/01 at p. 5-9; Appeal Brief transmitted 5/6/02 at p. 14-20, Response to the Office Action of 8/1/02 at p. 16-18.) Applicant contends that the arguments raised against the Examiner's previous attempts to assert this combination apply to the Examiner's latest attempt. Below, Applicant reiterates the most relevant previous arguments.

Concerning the Examiner's specific reasoning in this latest Office Action, the Examiner began by discussing the apparatus disclosed in Uchida. (Office Action dated 2/13/03 at p. 4.) The Examiner then admitted that Uchida shows the tip of its apparatus contacting the edge bead. (*Id.*) Subsequently, the Examiner focused on Uchida's text indicating the distance between apparatus and the substrate under the edge bead. (*Id.*) The Examiner also went as far as to admit that Uchida does not illustrate its apparatus being spaced from the edge bead. (*Id.*) The Examiner then cited Honda as representing a conventional edge bead removal apparatus in that it is spaced from the edge bead. (*Id.*) The Examiner then concluded it would be obvious to space Uchida's apparatus from the coated substrate. (*Id.*) The Examiner believes motivation for that modification comes from the convention exemplified by Honda and the desirability of preventing wear and tear on the tip and eliminating excess cleaning. (*Id.* at p. 4-5.) The Examiner ended by announcing that "it is deemed to be within the level of ordinary skill in the art" to distance Uchida's apparatus from a substrate surface to remove coating material from the substrate edge. (*Id.* at p. 5.)

Applicant contends that the Examiner's reasoning is flawed, thereby demonstrating a failure to meet the *prima facie* burden for rejection. Further, the express teachings of Uchida and Honda discourage their combination in general and the proposed modification in particular so that the *prima facie* burden for rejection cannot be met relying on this combination.

a) Flaws in the Examiner's reasoning

First, Applicant contends there are flaws in the Examiner's reasoning in terms of the Examiner's characterization of Uchida, the Examiner's belief concerning conventions in the art, the Examiner's motives for combination, and the Examiner's announcement concerning the skill level of an ordinary artisan. Applicant submits that any one or combination of these flaws demonstrate the failure to meet the *prima facie* burden for rejection.

i. The Examiner's mischaracterization of Uchida

The Examiner's characterization of the Uchida reference indicates an attempt to downplay the true import of that reference's teachings. For instance, the Examiner focuses on Uchida's text indicating a gap between Uchida's apparatus and the substrate. (Office Action dated 2/13/03 at p. 5 (citing the last page of the Uchida translation).) Applicant contends Uchida's disclosure is not surprising nor is it supportive of rejection given that there is a coating on Uchida's substrate and that Uchida's apparatus does contact that coating. The Examiner goes so far as to admit in one sentence that Uchida illustrates such contact. By the end of that sentence, however, the Examiner cited the gap addressed above, presumably in some attempt to lessen the effect of that admission. Curiously, the Examiner then describes Uchida in terms of what it does not illustrate, pointing out that "Uchida et al do not illustrate the apparatus being positioned or configured above the thick film part." Applicant contends that Uchida is not so passive as the Examiner's characterization indicates. Not only does Uchida illustrate direct contact between its apparatus and the substrate coating, Uchida expresses that in its text as well. Specifically, Uchida affirmatively expresses that its suction nozzle "contact the coating solution." (Uchida translation at 3.) While the Examiner appears to be content to cite text believed to support rejection, Applicant invites the Board to also consider the text cited by Applicant. Applicant further contends that the Examiner was obligated to do more than trivialize express language and clear illustrations in Uchida. Rather, the Examiner was required to consider Uchida as a whole (*see McLaughlin*, 170 U.S.P.Q. at 212), including teachings that conflict with the proposed modifications and with teachings from other references (*see Young*, 18 U.S.P.Q.2d at 1091). Applicant also alerts the Board that the Examiner has failed to explain how disclosure of a coating between Uchida's apparatus and substrate supports rejection, especially when Uchida's apparatus contacts that coating. Applicant submits that the Examiner's failure to do so results in a failure to meet the *prima facie* burden for rejection using Uchida.

ii. the Examiner's mistaken belief concerning conventions in the art

As part of the attempt to reject based on a Uchida/Honda combination, the Examiner supposed that Honda's teachings demonstrate the convention in the art -- at least in terms of the

device's distance from a material on the workpiece during operation. (Office Action dated 2/13/03 at p. 4.) It is noteworthy, however, that of the latest four prior art references used to reject the appealed claims – Honda, Kottman, Isono, and Uchida -- fully half of them teach contacting the material on the workpiece during operation. (See Isono at Fig. 1; Uchida at Fig. 3.) Hence the Examiner's own art refutes the Examiner's belief concerning what is conventional. Rather, the Examiner's selection of the most relevant art demonstrates that, at best, there is no clear direction in the art in terms of a device's distance from a material on the workpiece during operation. Lacking such direction, one of ordinary skill in the art necessarily lacks the motivation to combine the teachings in the manner proposed by the Examiner.

iii. the Examiner's untenable motives for combination

As for the Examiner's suggestion that one of ordinary skill in the art would be motivated to substitute Uchida's teachings with Honda's teachings concerning device placement in order to prevent wear and tear on Uchida's device, Applicant notes that 50% of the Examiner's closest relevant art allows the device to directly contact a material on the workpiece. (Isono at Fig. 1; Uchida at Fig. 3). As a result, one of ordinary skill in the art is informed that such direct contact will not pose any wear and tear problems.

Regarding the Examiner's suggestion that one of ordinary skill in the art would be motivated to substitute Uchida's teachings with Honda's teachings concerning device placement in order to eliminate excess cleaning of Uchida's device, it is noteworthy that Uchida acknowledges the cleaning issue as a problem with prior art devices (Uchida at ¶4 of part 3, latest translation) and purports to solve that problem with its device (*id.* at last ¶ of part 3). Hence, one of ordinary skill in the art is taught that Uchida addresses that concern without the need for modification, thereby refuting the Examiner's assumed motive.

Moreover, it is significant that the Examiner's articulated motives addressed directly above are contrary to Uchida's express teachings concerning device/workpiece layer contact. As a result, the Examiner is effectively arguing that one of ordinary skill in the art is prepared to reject a sizable and fundamental portion of Uchida's teachings. It is then questionable whether the artisan would put any value in the remnants of Uchida's disclosure. Thus, the Examiner's

harsh criticism of Uchida's teachings suggest that an ordinary artisan would avoid its teachings altogether.

iv. Examiner's announcement concerning the skill level of an ordinary artisan

At the conclusion of the Uchida/Honda rejection, the Examiner announced that "it is deemed to be within the level of ordinary skill in the art to position or configure the Uchida et al apparatus an appropriate distance from the surface of the substrate to remove one or plural layers of coating material from the edge of the substrate." (Office Action dated 2/13/03 at p. 5.) It is unclear whether this statement is a conclusion based on the arguments presented above or a separate argument attempting to support the rejection. If the statement is the former, Applicant's arguments presented above and below refute that conclusion. If the statement is the latter, the conclusory nature of the Examiner's statement fails to suggest motivation one of ordinary skill in the art would have to choose that option (*see Ethicon*, 41 U.S.P.Q.2d at 1233; *Dembiczak*, 50 U.S.P.Q.2d. at 1617). Either way, the statement in no way cures the other flaws with the attempted rejection.

b) The express of teachings of Uchida and Honda discourage their combination in general and the proposed modification in particular

In addition to the flaws in the Examiner's current and prior attempts to combine Uchida and Honda, Applicant contends that any attempt to combine those references will suffer due to the unavoidable fact that their teachings conflict to such a degree that one of ordinary skill in the art would be discouraged from combination. Hence, the *prima facie* burden for rejection cannot be met relying on this combination.

i. The express of teachings of Uchida and Honda conflict on the
very point relied on by the Examiner

The most relevant conflict between the references concerns the very point relied upon by the Examiner – contact between the apparatus and a workpiece layer. As the Examiner has admitted and Applicant has more forcefully emphasized, Uchida affirmatively and expressly teaches physically contacting its suction nozzle apparatus to a workpiece layer; such teaching is not only clearly illustrated in Uchida’s relevant drawing but also articulated in the text. (Uchida translation at 3 (disclosing a suction nozzle placed “immediately opposite” the coating material to the extent that the nozzle actually comes into “contact” with the coating solution); FIG. 3.) Moreover, Uchida gives one of ordinary skill in the art a reason for such a configuration; specifically, Uchida expresses that its apparatus and method of use avoids the clogging during operation, as suffered by prior art devices and methods. (Uchida translation at p. 2, ln. 38-41; p. 4, ln. 12-17.) The Examiner’s attempt to trivialize such disclosure throughout prosecution merely demonstrates the Examiner’s failure to consider the reference as a whole as well as the Examiner’s improper use of hindsight. (See *McLaughlin*, 170 U.S.P.Q. at 212; *Dembiczak*, 50 U.S.P.Q.2d. at 1617.) Further, Uchida’s teachings regarding contacting a workpiece layer with an apparatus are not accidental nor are they incidental given the articulated clogging problem Uchida seeks to solve and given that such teachings were validated as recently as the 1990’s with Isono’s publication.

Honda’s apparatus, on the other hand, teaches expressly avoiding contacting any part of any layer of the workpiece during operation. (Honda translation at p. 3, ln. 40 (expressly having its nozzle “draw in air with its vacuum suction part”); FIG. 3.) Further, the Examiner appears to believe that Honda’s configuration prevents wear and tear on the apparatus (Office Action dated 8/1/02 at p. 6; Office Action dated 11/19/01 at p. 2 (citing the previous Office Action); Office Action dated 2/28/01 at p. 4-5.) Thus, according to the Examiner’s own admission repeated throughout prosecution, one of ordinary skill in the art considering Uchida in light of Honda would view Uchida as undesirably inviting excess wear and tear on suction/dispensing devices. Conversely, such an artisan considering Honda in light of Uchida would view Honda as unnecessarily risking clogging. As a result, one of ordinary skill in the art would be discouraged from combining these references.

ii. The express of teachings of Uchida and Honda conflict in general

In addition, broadening the consideration of the references to encompass their more general matters would even further discourage the ordinary artisan from combination. In a manner analogous to the Examiner's attempted Kottman/Honda combination, Applicant contends that the fundamental purpose of Uchida and Honda conflict to the highest degree. As mentioned above, the main purpose and function of Honda is to make the time for developing the resin at the substrate edge equal to the time for developing the resin at the interior of the substrate. (Honda translation at ¶¶0007, 0011.) Honda achieves this by using concentrated developer at the substrate's edge to counteract its thicker resin. (*Id.* at ¶¶0006, 0007, 0011.) Because the substrate's edge is equally developed in comparison to the substrate's interior, it follows that the resin-removal process may be applied equally across Honda's substrate, with no need for a specially-configured cleaning device or methods for the periphery. (*See Id.* at ¶0007.) However, Uchida proposes just such a cleaning device and method. Specifically, Uchida addresses suctioning coating liquid from the edges of its workpiece (Uchida translation at §2.) In the subsequent section, Uchida notes the tendency of a thickened coating layer to form at the edges of the workpiece, suggests spraying liquid onto the edges of its workpiece, and again indicates that its device suctions up coating solution from the workpiece sides (*Id.* at §3.) As a result, Honda teaches one of ordinary skill in the art that the devices, materials, and methods in Uchida, are unnecessary. Conversely, Uchida teaches one of ordinary skill in the art that Honda's techniques are unnecessary because Uchida's special treatment of the substrate's periphery eliminates the need for Honda's special pre-treatment in that area. Thus, because each reference refutes the main purpose and function of the other, one of ordinary skill in the art would be discouraged from combining such references. Applicant submits that such an argument is as effective against the Uchida/Honda combination as it is against the current Kottman/Honda combination and the previously withdrawn Honda/Matsumura combination (*see* Appeal Brief transmitted 5/6/02 at p. 5-6).

c) the Examiner's attempts to refute Applicant's previously raised arguments against this rejection are untenable

As with the rejections addressed above, the Uchida/Honda rejection in the final Office Action is substantially the same as the Uchida /Honda rejection raised in the previous Office Action. (*Compare* the final Office Action dated 2/13/03 at p. 4-5 *with* the Office Action dated 8/01/02 at p. 5-6.) Accordingly, Applicant has previously presented the arguments in parts (B)(2)(a)-(b). (Response to the Office Action dated 8/01/02 at p. 12-18.) As a result, the final Office Action contains a response to these arguments. (Final Office Action dated 2/13/03 at p. 8.) Applicant contends that the Examiner's response is insufficient to refute Applicant's arguments.

After attempting to restate Applicant's arguments, the Examiner deems the arguments to be unpersuasive for the reasons set forth in "Paper No. 17, pages 5-7." Applicant alerts the Board that "Paper No. 17" is a previous final Office Action dated 11/19/01. That previous final Office Action asserts Uchida/Honda as a basis for rejection and cites an even earlier Office Action for the reasoning supporting that rejection. (Office Action dated 11/19/01 at p. 2 (citing Office Action dated 2/28/01).) Applicant subsequently filed an Appeal Brief refuting this reasoning. (Appeal Brief Transmitted 5/6/02 at p. 14-20.) Significantly, the Examiner responded by reopening prosecution, presenting "[n]ew grounds of rejection." (Office Action dated 8/01/02 at p. 2.)

Thus, if the Examiner believes that the "new" Honda/Uchida rejection is the same as the old Honda/Uchida rejection, then Applicant has already refuted that rejection and the Examiner has acknowledged so by reopening prosecution. If, on the other hand, the Examiner believes that the "new" Honda/Uchida rejection is different from the old Honda/Uchida rejection, then Applicant contends that the arguments in favor of the old rejection are inapplicable to the new rejection.

The Examiner then announces that Uchida and Honda do not conflict. (Office Action dated 2/13/03 at p. 8.) In refutation of this announcement, Applicant refers the Board to the conflicts highlighted above in part (B)(2)(b). Further, the Examiner's announcement, in combination with the Examiner's subsequent statements that Uchida and Honda are structurally combinable as envisioned by the Examiner "with no physical destruction," demonstrate the same

failures in this §103 rejection as in the one addressed above in part (B)(1). Specifically, such statements demonstrate a failure to consider the references as a whole (*see McLaughlin*, 170 U.S.P.Q. at 212) and a failure to consider the ability of each reference to suggest solutions to one of ordinary skill in the art when the prior art contains conflicting references (*see Young*, 18 U.S.P.Q.2d at 1091). Such statements also demonstrate that the Examiner has fallen “into the hindsight trap” – having inappropriately used hindsight gained from the current invention in order to focus on particular points of prior art – given the Examiner’s ability to ignore the legion of contradictions between the teachings of Uchida and Honda and focus solely on particular excerpts that purportedly support an obviousness rejection. (*See Dembiczak*, 50 U.S.P.Q.2d. at 1617.)

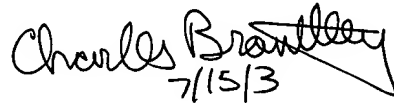
C. Conclusion

Applicant's arguments presented above demonstrate that the allegedly anticipating references fail to disclose all of the limitations in the relevant claims. Applicant notes that Honda's express teachings contradict what the Examiner believes to be Honda's inherent teachings. Further, the Examiner's interpretation of the Fisch reference, relied upon to demonstrate Honda's inherent teachings, results in Honda being unable to achieve its stated goals. Hence, the Examiner's inherency argument fails.

Applicant's arguments presented above also demonstrate that the attempted combinations for obviousness rejections are untenable in light of the legion of conflicts a careful reading of those references brings to light. Thus, when the references are considered as a whole, their inability to provide suggestions given their conflicts is considered, and improper hindsight is avoided, one of ordinary skill in the art is actively discouraged from the proposed combinations in general and the Examiner's specific modifications in particular.

Furthermore, the Examiner's previous attempts to respond to arguments such as these demonstrate misinterpretations of those arguments and/or contain admissions that further support the Board's reversal of the Examiner, withdrawal of the rejections, and allowance of the claims. Accordingly, Applicant respectfully requests that the Board do so.

Respectfully submitted,



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Appendix 1: Copy of Involved Claims

12. A processor for a spin coating device including a chuck defining a wafer accommodation area, comprising:

at least one dispenser of a first material that is a solvent with respect to a second material on a wafer configured to occupy said wafer accommodation area; and
a suction mechanism generally around said at least one solvent dispenser and offset from said wafer accommodation area during an operational mode of said device.

13. The processor in claim 12, wherein said at least one dispenser further comprises:

a first dispenser on a first side of said wafer accommodation area; and
a second dispenser on a second side of said wafer accommodation area.

14. A bead remover for a wafer, comprising:

a negative pressure mechanism configured to be spaced from a bead on said wafer while operating upon said bead; and
a dispensing mechanism aligned with said negative pressure mechanism, wherein said dispensing mechanism is configured to deliver a chemical that dissolves said bead.

15. A bead remover for a wafer, comprising:

a negative pressure mechanism configured to be spaced from a bead on said wafer while operating upon said bead; and
a solvent-dispensing mechanism aligned with said negative pressure mechanism, wherein

said solvent-dispensing mechanism is concentric to said negative pressure mechanism.

16. The bead remover of claim 15, wherein said solvent-dispensing mechanism is generally within said negative pressure mechanism.

17. An edge bead remover configured to service a spinning wafer, comprising:

a nozzle configured to apply an edge bead-dissolving substance to an edge of said wafer;

and

a vacuum mechanism enveloping said nozzle and offset from an edge bead during application of said substance to said edge.

18. The edge bead remover of claim 17, wherein said vacuum mechanism is configured to remove said substance from said edge.

19. An edge bead remover configured to service a spinning wafer, comprising:

a nozzle configured to apply an edge bead-dissolving substance to an edge of said wafer;

and

a vacuum mechanism enveloping said nozzle and offset from said edge during application of said substance to said edge, wherein said vacuum mechanism is configured to remove said substance from said edge, and wherein said vacuum mechanism envelopes said edge.

20. A material removal system for a wafer, comprising:

a negative pressure device defining a vacuum area on more than one side of said wafer
while said device is in an operational position; and
a solvent dispenser intersecting said vacuum area and aligned with an edge of said wafer
while said device is in said operational position.

21. The material removal system of claim 20, wherein said negative pressure
device is distal from said wafer while said device is in said operational position.

22. An edge bead removal system for a wafer having an edge and a top and a bottom,
comprising:

a first solvent nozzle poised above said top of said wafer at said edge during a
dispensing mode of said system;
a second solvent nozzle poised below said bottom of said wafer at said edge during said
dispensing mode; and
a suction device encompassing said first solvent nozzle and said second solvent nozzle.

23. The edge bead removal system in claim 22, wherein said suction device encompasses said
top and said bottom of said wafer at said edge.

24. A chemical dispensing system for a workpiece, comprising:

a negative pressure device defining a portal disposed toward and spaced from all surfaces
of said workpiece while acting upon said workpiece; and
a first dispenser within said negative pressure device and disposed toward at least one

surface of said workpiece while dispensing a chemical that dissolves a material on said workpiece.

25. The chemical dispensing system in claim 24, wherein said portal is spaced around an edge of said workpiece.

26. A chemical dispensing system for a workpiece, comprising:

a negative pressure device defining a portal disposed toward and spaced from all surfaces of said workpiece while acting upon said workpiece, wherein said portal is spaced around an edge of said workpiece;

a first solvent dispenser within said negative pressure device and disposed toward at least one surface of said workpiece while acting upon said workpiece; and

a second solvent dispenser within said negative pressure device, disposed toward said edge, and opposing said first solvent dispenser.

27. The chemical dispensing system in claim 26, wherein said first solvent dispenser and said second solvent dispenser are within said portal.

28. A chemical remover for a substrate, comprising:

a nozzle directed toward said substrate during a dispensation mode and configured to

couple to a source of a chemical that can dissolve a material on said substrate; and

a vacuum device spaced from said material and directed toward said nozzle during said dispensation mode.

29. A profiler for a wafer, comprising:

a dispenser perpendicular to said wafer during a dissolution process; and

a vacuummer surrounding at least a portion of said dispenser and separate from an outermost surface of said wafer during said dissolution process.

30. The profiler in claim 29, wherein said dispenser further comprises a location wherein solvent exits said dispenser; and wherein said vacuummer surrounds said location.

31. A profiler for a wafer, comprising:

a dispenser perpendicular to said wafer during a dissolution process and comprising a location wherein solvent exits said dispenser;

a vacuummer surrounding at least a portion of said dispenser and separate from said wafer during said dissolution process, wherein said vacuummer surrounds said location; and an additional dispenser perpendicular to said wafer; wherein said vacuummer surrounds at least a portion of said additional dispenser.

32. The profiler in claim 31, wherein said dispenser is disposed toward a top side of said wafer.

33. The profiler in claim 32, wherein said additional dispenser is disposed toward a bottom side of said wafer.



In re Zurko
U.S. Court of Appeals Federal Circuit

No. 96-1258

Decided August 2, 2001

PATENTS

[1] Patentability/Validity -- Obviousness -- Combining references (§ 115.0905)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Judicial review -- Standard of review -- Patents (§ 410.4607.09)

Decision of Board of Patent Appeals and Interferences sustaining obviousness rejection of patent application for method of improving security in computer system is reversed, even though board's factual findings underlying its determination are reviewed under "substantial evidence" standard, since prior art references relied upon by board do not teach limitation requiring communications between user and "trusted" environment along "trusted" path, and since deficiencies of references cannot be remedied by reliance upon additional combination of alternative references cited for first time on appeal, or by board's general conclusion, unsupported by evidence in record, that requiring communication with trusted environment over trusted path would be "basic knowledge" or "common sense" to person of ordinary skill in art; although board's expertise alone may provide sufficient support for conclusions as to peripheral issues, its core factual findings in patentability determinations must be supported by concrete evidence in record.

On remand from the U.S. Supreme Court.

Patent application of Mary E. Zurko, Thomas A. Casey Jr., Morie Gasser, Judith S. Hall, Clifford E. Kahn, Andrew H. Mason, Paul D. Sawyer, Leslie R. Kendall, and Steven B. Lipner, serial no. 07/479,666 (method for improving security in a computer system). Board of Patent Appeals and Interferences sustained examiner's rejection of application under 35 U.S.C. § 103. The U.S. Court of Appeals *1694 for the Federal Circuit reversed on appeal (42 USPQ2d 1476). On rehearing en banc, the Federal Circuit held (46 USPQ2d 1691) that proper standard of review for fact findings underlying patentability determinations by Patent and Trademark Office is "clearly erroneous" standard, rather than more deferential standard found

in Administrative Procedure Act. The U.S. Supreme Court reversed the Federal Circuit's en banc decision and remanded, holding (50 USPQ2d 1930) that PTO's findings of fact must be reviewed under either "substantial evidence" or "arbitrary and capricious" APA standards of review. On remand, the Federal Circuit again reverses board's decision.

Linda Moncys Isacson, associate solicitor, John M. Whealan, solicitor, and Kenneth R. Corsello and Thomas J. Finn, associate solicitors, U.S. Patent and Trademark Office, Arlington, Va., for Commissioner of Patents and Trademarks.

John F. Sweeney, Michael O. Cummings, Jon T. Hohenthanner, Israel Blum, Steven F. Meyer, and Brenda Pomerance, of Morgan & Finnegan, New York, N.Y.; Irene Kosturakis and Russell T. Wong, of Compaq Computer Corp., Houston, Texas; Ernest Gellhorn, Washington, D.C.; Janice M. Mueller, of Suffolk University Law School, Boston Mass.; Ronald C. Hudgens, of Digital Equipment Corp., Maynard, Mass., for Mary E. Zurko et al.

Before Newman, circuit judge, Archer, senior circuit judge, and Michel, circuit judge.

Archer, S.J.

This case is before us on remand from the Supreme Court of the United States. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999) (" *Zurko III*"). In *Zurko III*, the Court reversed our judgment and remanded the case because we had reviewed the factual findings of the Board of Patent Appeals and Interferences ("Board") for clear error, an incorrect standard of review.

The Board decision at issue, *Ex parte Zurko*, No. 94-3967 (Bd. Pat. Apps. & Int. Aug. 4, 1995), sustained the rejection of U.S. Patent Application No. 07/479,666 ("the '666 application") under 35 U.S.C. § 103 (1994). In our initial review of this decision, we determined that the Board's findings were clearly erroneous and we reversed. *In re Zurko*, 111 F.3d 887, 42 USPQ2d 1476 (Fed. Cir. 1997) (" *Zurko I*"). At the Commissioner's suggestion, we then reheard this case en banc to reconsider the question of the appropriate standard of review. The Commissioner argued that Board findings should be reviewed under the standards of the Administrative Procedure Act (APA), namely the substantial evidence or arbitrary and capricious

standard. 5 U.S.C. § 706 (1994). The en banc court held, however, that clear error was the correct standard of review for Board findings of fact and adopted the conclusions of the original panel decision. *In re Zurko*, 142 F.3d 1447, 46 USPQ2d 1691 (Fed. Cir. 1998) ("*Zurko II*").

The Commissioner then petitioned for review by the Supreme Court, and the Court reversed, holding that Board findings of fact must be reviewed under the APA standards of review. The Court did not specify which APA standard of review to apply, substantial evidence or arbitrary and capricious. We subsequently decided this question in *In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000), and held that substantial evidence is the correct APA standard of review for Board factual findings.

We now revisit the merits of our decision in *Zurko I*, applying the proper APA standard of review. In doing so, we conclude that the outcome of this case does not change with the application of this new standard of review. Because the factual findings underlying the Board's decision are not supported by substantial evidence, we reverse.

BACKGROUND

The '666 application concerns a method for more efficiently creating a secure computer environment. Secure, or "trusted," computer environments employ trusted software designed to preclude unauthorized users and to prevent unintended or unauthorized commands. Such trusted software is often quite costly, compared to untrusted software, so it is desirable to minimize the amount of trusted software in the system. Applicants claim a method for processing trusted commands with a minimum of trusted software.

Representative claim one reads as follows:

1. A machine-executed method for executing a trusted command issued by a user on a computer system, the computer system including an untrusted computing environment and a trusted computing environment, said method comprising the steps of:

***1695** (a) parsing the trusted command in the untrusted computing environment to generate a parsed command;

(b) submitting the parsed command to the trusted computing environment;

(c) displaying a representation of the trusted command to the user through a trusted path;

(d) receiving a signal from the user through a trusted path signifying whether the displayed representation accurately represents the user's intentions;

(e) if the signal signifies that the displayed representation does not accurately represent the user's intentions, then preventing the execution of the parsed command;

(f) if the signal signifies that the displayed representation accurately represents the users intentions, executing the parsed command in the trusted environment.

As set forth in claim one, applicants' method involves processing and verifying a trusted command using both trusted and untrusted software. A trusted command is first processed by untrusted software to create a parsed command. The parsed command is then submitted to the trusted computer environment. Execution of this command requires verification along a trusted path. The parsed command is relayed to the user along a trusted path, and, if correct, the user can send a confirming signal back along this trusted path, allowing execution of the command. By processing a trusted command in this manner, the applicants contend they reduce the amount of trusted software. The applicants assert that the parsing step generally requires a large amount of software and that performing this step with untrusted software greatly reduces the amount of trusted code required to process a trusted command.

The Board sustained the Examiner's rejection of claims 1, 4, and 5 of the '666 application under 35 U.S.C. § 103 based on two prior art references. The primary reference is the UNIX operating system, as described in the applicants' information disclosure statement ("IDS"). According to this description, the UNIX system employs both untrusted and trusted code. Furthermore, certain commands in a UNIX system may be parsed in an untrusted environment, and then these parsed commands may be executed by "calling a trusted service that executes in a trusted computing environment."

The secondary reference, also described in applicants' IDS, is Dunford, FILER Version 2.20 ("FILER2"). This program repeats back potentially dangerous commands, requesting confirmation from the user before execution.

Considering the teachings of these two references, the Board concluded that the invention claimed by the '666 application would have been obvious. The Board commented that "the artisan would have been led from these teachings to take the trusted command parsed in an untrusted environment and submitted to the trusted computing environment, as taught by UNIX, and to display the parsed command to the user for confirmation prior to execution, as suggested by [FILER2]." *Ex parte Zurko*, slip op. at 6-7. According to the Board, this combination would render the claimed invention obvious.

The Board also responded to applicants' arguments that neither reference discloses a trusted path communication to the user and that no teaching of the prior art references motivates the combination of these references to create the claimed invention. The Board said that communication along a trusted path, if not explicit in the prior art, is either inherent or implicit. *Id.* at 7. The Board further adopted the Examiner's assertion that "it is basic knowledge that communication in trusted environments is performed over trusted paths." *Id.* at 8. As for the motivation to combine these references, the Board concluded that it "would have been nothing more than good common sense" to combine the teachings of these references. *Id.* The Board noted that FILER2 taught the verification of dangerous commands in general, suggesting verification of the parsed command submitted to the trusted computing environment in UNIX. Because this verification occurs within a trusted environment, it is "basic knowledge," according to the Board, that this verification would occur along a trusted path. *Id.* at 7-8.

Reviewing the Board's decision in *Zurko I*, we held that "the Board's finding that the prior art teaches, either explicitly or inherently, the step of obtaining confirmation over a trusted pathway [was] clearly erroneous." *Zurko I*, 111 F.3d at 889, 42 USPQ2d at 1478. Indeed, we noted that neither reference relied upon by the Board taught communication with *1696 the user over a trusted pathway. *Id.*, 42 USPQ2d at 1479. We further held that the Board clearly erred in finding that the prior art teaches communicating with the user over both a trusted and an untrusted path. This finding was in conflict with the Board's other finding that trusted communications must be over trusted paths. *Id.* at 890, 42 USPQ2d at 1479.

On remand, applicants urge that we maintain our reversal of the Board's decision, arguing that the decision is legally flawed, or, alternatively, that the

Board's factual findings fail under the APA standard of review. The Commissioner responds that we must affirm the Board decision because its findings are supported by substantial evidence in the record.

DISCUSSION

A claimed invention is unpatentable for obviousness if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (1994); *Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 USPQ 459, 465 (1966). Obviousness is a legal question based on underlying factual determinations including: (1) the scope and content of the prior art, including what that prior art teaches explicitly and inherently; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *Graham*, 383 U.S. at 17-18, 148 USPQ at 467; *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (stating that the inherent teachings of a prior art reference is a question of fact). We review the ultimate legal determination of obviousness without deference. *In re Dembiczak*, 175 F.3d at 998, 50 USPQ at 1616. We review factual findings underlying this determination for substantial evidence. *In re Gartside*, 203 F.3d at 1311-16, 53 USPQ2d at 1772-75.

Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); *see also Zurko III*, 527 U.S. at 162, 50 USPQ2d at 1772-75. A review under this standard "involves an examination of the record as a whole, taking into consideration evidence that both justifies and detracts from the agency's decision." *In re Gartside*, 203 F.3d at 1312, 53 USPQ2d at 1773 (citing *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88 (1951)). In addition, "the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." *Consolo v. Fed. Maritime Comm'n*, 383 U.S. 607, 619-20 (1966).

The substantial evidence standard has been analogized to the review of jury findings, and it is generally considered to be more deferential than the clearly erroneous standard of review. *Zurko III*, 527 U.S. at 162-63, 50 USPQ2d at 1936. The Supreme

Court noted in *Zurko III*, however, that this generally recognized difference is "a subtle one," so fine that in its review of case law in the *Zurko III* decision, the Court could not find any other case where a reviewing court had conceded that the standard of review made a difference. *Id.* Moreover, while appellate courts must respect agency expertise, the Court has "stressed the importance of not simply rubber-stamping agency fact finding." *Id.* (citing *Universal Camera*, 340 U.S. at 477-78). Indeed, the Court observed that Federal Circuit judges "will examine [Board fact] findings through the lens of patent-related experience -- and properly so, for the Federal Circuit is a specialized Court." *Id.* The Court further noted that this "comparative expertise, by enabling the Circuit better to understand the basis for the [Board's] finding of fact, may play a more important role in assuring proper review than would a theoretically somewhat stricter standard." *Id.*

With this guidance from the Supreme Court in mind, we now reconsider the Board's decision. Applicants urge that we reaffirm our conclusion in *Zurko I*, alleging numerous legal and factual errors in the Board decision. These arguments center around two issues. First, applicants argue that the prior art relied upon by the Board does not disclose one of the limitations of their claimed invention, namely communication between a trusted environment and the user along a trusted path. Second, applicants claim that there is no substantial evidence support for the Board's finding of motivation to combine the cited references to yield the claimed invention. We only need to consider the first issue raised by applicants.

As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings concerning the content of the prior art are supported by four other references in the record. [FN1][1] As to this first issue, the Commissioner apparently concedes that neither the UNIX IDS disclosure nor FILER2 teaches communications between the user and the trusted environment along a trusted path. Nevertheless, the Commissioner maintains that the Board's findings concerning the content of the prior art are supported by four other references in the record. [FN1] The Commissioner argues that these additional references describe modified UNIX systems that allow communication over both trusted and untrusted paths. Therefore, the Commissioner argues, the

Board's general findings concerning the content of the prior art have substantial evidence support, as does its ultimate conclusion of obviousness.

We are unpersuaded by the Commissioner's arguments. The Board's conclusion of obviousness was based on the UNIX and FILER2 references. The Board's findings with respect to these references simply cannot be supported by the alternative references identified by the Commissioner on remand. To the contrary, these alternative references merely confirm the well-known fact that conventional UNIX systems do not allow communication between the user and the trusted environment along a trusted path. For example, Johrie et al., U.S. Pat. No. 4,918,653, comments that "[s]ome examples of prior art multi-user operating systems which have not provided an effective mechanism for establishing a trusted path include UNIX . . ." Johrie, col. 1, II. 60-63.

The Commissioner also cannot now mend the Board's faulty conclusion of obviousness by substituting these alternative references for those relied upon by the Board. This new combination of references would constitute a new ground for rejection, not considered or relied upon by the Examiner or the Board. It is well settled that it would be inappropriate for us to consider such a new ground of rejection. *In re Margolis*, 785 F.2d 1029, 1032; 228 USPQ 940, 942 (Fed. Cir. 1986) ; see also *Koyo Seiko Co., Ltd. v. United States*, 95 F.3d 1094, 1099 (Fed. Cir. 1996) (holding that "[t]he grounds upon which an administrative order must be judged are those upon which the record discloses that its action was based.") (quoting *SEC v. Chenery Corp.*, 318 U.S. 80, 87 (1943)).

Finally, the deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is "basic knowledge" or "common sense" to one of ordinary skill in the art. As described above, the Board contended that even if the cited UNIX and FILER2 references did not disclose a trusted path, "it is basic knowledge that communication in trusted environments is performed over trusted paths" and, moreover, verifying the trusted command in UNIX over a trusted path is "nothing more than good common sense." *Ex parte Zurko*, slip op. at 8. We cannot accept these findings by the Board. This assessment of basic knowledge and common sense was not based on any evidence in the record and, therefore, lacks substantial evidence support. As an administrative tribunal, the Board clearly has expertise in the subject matter over which it exercises jurisdiction. This expertise may provide sufficient

support for conclusions as to peripheral issues. With respect to core factual findings in a determination of patentability, however, the Board cannot simply reach conclusions based on its own understanding or experience -- or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings. [FN2] To hold otherwise would render the process of appellate review for substantial evidence on the record a meaningless exercise. *Baltimore & Ohio R.R. Co. v. Aderdeen & Rockfish R.R. Co.*, 393 U.S. 87, 91-92 (1968) (rejecting a determination of the Interstate Commerce Commission with no support in the record, noting that if the Court were to conclude otherwise "[t]he requirement for administrative decisions based on substantial evidence and reasoned findings -- which alone make effective judicial review *1698 possible -- would become lost in the haze of so-called expertise"). Accordingly, we cannot accept the Board's unsupported assessment of the prior art.

CONCLUSION

The Board's conclusion of obviousness was based on a misreading of the references relied upon and, therefore, lacks substantial evidence support.

Accordingly, the Board's judgment is reversed.

REVERSED.

FN1. Specifically, the Commissioner points to Johrie et al, U.S. Pat. No. 4,918,653; E.J. McCauley et al., *KSOS: The Design of a Secure Operating System*, Ford Aerospace and Communications Corp. (1979); Stanley R. Ames, Jr. et al., *Security Kernel Design and Implementation: An Introduction*, IEEE Cat. No. 830700-001 (July 1983); and Simon Wiseman et al., *The Trusted Path Between Smite and the User*, Proceedings 1988 IEEE Symposium on Security and Privacy (April 18-21, 1988).

FN2. As described above, we cannot accept the Commissioner's invitation to now search the record for references in support of the Board's general conclusions concerning the prior art. Even if any such references could support these conclusions, it would be inappropriate for us to consider references not relied upon by the Board. *In re Margolis*, 785 F.2d at 1032; 228 USPQ at 942.

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Appendix 4: *Vitronics Corp. v. Conceptoronic Inc.*, 90 F.3d 1576, 39 U.S.P.Q.2d 1573 (Fed. Cir. 1996)

▷

Vitronics Corp.
v.
Conceptronic Inc.

U.S. Court of Appeals Federal Circuit

No. 96-1058

Decided July 25, 1996

United States Patents Quarterly Headnotes

PATENTS

[1] Patent construction -- Claims -- Defining terms
(Section 125.1305)

Term "solder reflow temperature," as used in claim for method of reflow soldering electrical devices to printed circuit boards, must be construed to mean "peak reflow temperature" of solder rather than lower "liquidus temperature" of solder, since "peak reflow temperature" and "liquidus temperature" are given distinctly different meanings in specification, and since claim, in order to be consistent with specification and preferred embodiment described therein, must be construed such that "solder reflow temperature" means peak reflow temperature.

PATENTS

[2] Patent construction -- In general (Section 125.01)

Federal district court may rely on expert testimony and other extrinsic evidence to help it understand underlying technology in patent case, but may rely on expert testimony concerning proper construction of disputed patent term only in rare event that patent documents, taken as whole, are insufficient to enable court to construe disputed term; even then, prior art documents and dictionaries are more reliable guides than opinion testimony on claim construction, which is no more reliable than opinion testimony on statutory construction and should therefore be treated with utmost caution.

PATENTS

Particular patents -- Electrical -- Circuit boards

4,654,502, Furtek, method for reflow soldering of surface mounted devices to printed circuit boards, judgment of non-infringement as matter of law reversed.

*1573 Appeal from the U.S. District Court for the District of New Hampshire, Loughlin, J.

Action by Vitronics Corp. against Conceptronic Inc. for patent infringement. From judgment as matter of law that plaintiff failed to prove infringement, plaintiff appeals. Reversed and remanded.

Related decision: 27 USPQ2d 1046 .

James J. Foster, Lawrence M. Green, and Brett N. Dorny, of Wolf, Greenfield & Sacks, Boston, Mass., for plaintiff-appellant.

Paul J. Hayes and Dean G. Bostock, of Weingarten, Schurgin, Gagnebin & Hayes, Boston, for defendant-appellee.

Before Michel and Lourie, circuit judges, and Friedman, senior circuit judge.

Michel, J.

Vitronics Corporation ("Vitronics") appeals the September 27, 1995 order of the United States District Court for the District of New Hampshire, Civil Action No. 91-696-L, entering judgment as a matter of law that Vitronics did not prove that Conceptronic, Inc. ("Conceptronic") infringed claim 1 of U.S. Patent No. 4,654,502 ("the '502 patent"). The appeal was submitted for decision after oral argument on May 8, 1996. Because we conclude that the specification of the '502 patent dictates a claim interpretation in accordance with the plaintiff's proposed construction, and that, so construed, the '502 patent may have been infringed, we reverse the trial court's decision and remand for further proceedings.

BACKGROUND

The Patented Invention

Vitronics and Conceptronic both manufacture ovens used in the production of printed circuit boards. The ovens are used to solder electrical devices (such as resistors, *1574 capacitors and integrated circuits) to the boards. Several methods of soldering devices to boards have been developed; the '502 patent, assigned to Vitronics, is directed to one of those methods.

Specifically, the '502 patent is directed to a method for the reflow soldering of surface mounted devices to a printed circuit board in which the circuit board is moved by a conveyor through a multizone oven. In this process, a solder paste is placed on the circuit board and the devices to be soldered (with attached

connectors) are placed on the paste. The circuit board is then placed on what is basically a conveyor belt running through an oven and passing through several different heating zones. In the final and hottest zone, the solder paste melts and forms a connection between the device and the circuit board. The boards remain in the last heating zone for only a short duration, allowing the solder to reach a temperature high enough to cause the solder to melt and reflow while maintaining the devices themselves below the solder reflow temperature. Due to this temperature differential, the solder flows up the device connectors to form a solid connection.

Claim 1 of the '502 patent, the only claim at issue in this appeal, reads as follows (with added emphasis on the disputed terms):

1. A method for reflow soldering of surface mounted devices to a printed circuit board comprising:

moving a printed circuit board having solder and devices disposed on a surface thereof through a first zone and in close proximity to a first emitting surface of at least one nonfocused infrared panel emitter, said first emitting surface being at a first panel temperature;

moving said board through a second zone and in close proximity to a second emitting surface of at least one nonfocused infrared panel emitter, said second emitting surface being at a second panel temperature lower than said first panel temperature; and

moving said board through a third zone and in close proximity to a third emitting surface of at least one nonfocused infrared panel emitter, said third emitting surface being at a third panel temperature higher than said second panel temperature, said third emitting surface heating said board and said solder to a *solder reflow temperature* for a period of time sufficient to cause said solder to reflow and solder said devices to said board while maintaining the temperature of said devices below *said solder reflow temperature*.

Proceedings Before the District Court

This action was brought on November 26, 1991 by Vitronics against Conceptronic for infringement of both the '502 patent and U.S. Patent No. 4,833,301 ("the '301 patent"). [FN1] At the time the suit was filed, Conceptronic was selling the "Mark series" line of ovens. Conceptronic later discontinued the Mark series and began selling the "HVC series" line of ovens. Prior to trial, the parties stipulated that every

limitation of claim 1 of the '502 patent was met by the HVC series of ovens, except the limitation requiring the utilization of "nonfocused infrared panel emitters" and the limitation that the temperature of the devices must be maintained below the "solder reflow temperature." [FN2]

Vitronics, by way of a request for a jury instruction, asked the court to construe the meaning of the "solder reflow temperature" limitation. The specific instruction sought by Vitronics was as follows:

In considering the question of whether the '502 method patent has been infringed by the Mark and HVC Series ovens, you have to decide whether, in use, those ovens maintain the temperature of the devices below the solder reflow temperature. The phrase "solder reflow temperature" in the '502 patent means the temperature reached by the solder during the period it is reflowing during the final stages of the soldering process, sometimes referred to as the "peak solder reflow temperature." It does not mean the "liquidus temperature," the temperature at which the solder first begins to melt. Thus, if the temperature of the devices stays below that of the solder, the '502 method patent is infringed by the Mark and HVC Series ovens.

Thus, Vitronics contended that, as used in the claim, solder reflow temperature means peak reflow temperature, *i.e.*, a temperature approximately 20 degrees C above the liquidus temperature, at which the solder is completely melted and moves freely. Conceptronic, on the other hand, contended that solder reflow temperature means 183 degrees C, *i.e.*, the liquidus temperature of a particular type of solder known as 63/37 (Sn/Pb) solder. [FN3]

***1575** The district court delayed construing the disputed language until the close of testimony, at which time it ruled in favor of Conceptronic and concluded that the term "solder reflow temperature" as used in claim 1 refers to 183 degrees C. Vitronics then conceded that the court was required to grant judgment as a matter of law in favor of Conceptronic, as Vitronics had not presented any evidence of infringement under the court's interpretation of solder reflow temperature. This appeal followed.

Claim Construction Aids Before the District Court

In spite of Vitronics' early request for a jury instruction on the proper claim construction, the district court delayed announcing its claim construction until hearing all the evidence put forth at trial. During

trial, and in their briefs to the district court in support of their respective claim constructions, the parties discussed the patent specification, expert testimony, prior testimony and writings of Vitronics and its employees, and technical references. The most pertinent materials are discussed below. *The Patent Specification*

Vitronics relied heavily upon the patent itself to support its asserted claim construction. Although Vitronics conceded that the term "solder reflow temperature" may be ambiguous when considered in isolation, it argued that the specification clearly shows that, as used in the claim, solder reflow temperature means peak reflow temperature rather than the liquidus temperature. In particular, Vitronics pointed to that part of the specification that describes a preferred embodiment:

A preferred embodiment of the invention for reflow soldering of surface mounted devices to printed circuit boards will now be described. The printed circuit boards are typically made of epoxy-glass, such as fire retardant 4(FR- 4), or polyamide glass. These boards typically degrade above temperatures of 225 degrees C. The solder may be, for example, 60/40 (Sn/Pb), 63/ 37 (Sn/Pb), or 66/2 (Sn/Pb/Ag), all of which have a liquidus temperature (*i.e.* begin to melt) of about 190 degrees C. and a peak reflow temperature of about 210 degrees -218 degrees C. Thus, to effect reflow soldering without damaging the board, the solder must be allowed to reach a temperature of at least 210 degrees C., but the board cannot reach a temperature of 225 degrees C.

... The board is then sent into a fifth zone 5 to bring the temperature of the board up to a temperature of approximately 210 degrees C., the devices up to approximately 195 degrees C., and the solder up to approximately 210 degrees C. for a period of time of from about 10 to about 20 seconds to cause the solder to flow. Because the devices are cooler than the board, the solder flows up the devices. ... The board spends approximately 60 seconds in the fifth zone, but only about 10 to 20 seconds at 210 degrees C. Thus, the board is at the solder reflow temperature for only a short period of time and the devices never reach the solder reflow temperature.

Vitronics pointed out that, in the example described as the preferred embodiment, the temperature of the solder is raised to 210 degrees C, the peak reflow temperature, and the temperature of the devices is raised to 195 degrees C, 5 degrees above the 190

degrees C liquidus temperature. Thus, as argued by Vitronics, the term "solder reflow temperature" must be construed so that it refers to the peak reflow temperature because the claim requires that the temperature of the devices be maintained below "said solder reflow temperature"; if solder reflow temperature were construed to refer to liquidus temperature, the preferred embodiment would not be covered by the patent claims. *Expert Testimony*

Conceptronic relied heavily on the expert testimony of Dr. Rothe. Dr. Rothe testified that the meaning of the term "solder reflow temperature" in claim 1 is synonymous with liquidus temperature. Dr. Rothe further testified that the solder reflow temperature for 63/37 (Sn/Pb) is 183 degrees C. Dr. Rothe likewise testified at trial that several technical articles written by those skilled in the art supported his view that solder reflow temperature refers to liquidus temperature. *The Testimony of Mr. Hall*

Conceptronic also relied on the testimony of Mr. Hall, the Chief Engineer at Vitronics. At trial, Mr. Hall confirmed that during his deposition he had testified that the reflow temperature of solder was 183 degrees C. Mr. Hall also testified that, during his deposition, he had used solder reflow temperature to refer to liquidus temperature. However, at another point in his trial testimony, Hall explained *1576 that, while in his earlier deposition testimony he had used solder reflow temperature to refer to liquidus temperature, he did not suggest that was how the term was used in the patent. Rather, Hall testified the patent uses the term to refer to the peak reflow temperature. Paper Written By Former Vitronics Employee

Conceptronic also introduced into evidence a paper written by Phillip Zarrow, a former employee of Vitronics, defining solder reflow temperature in the following manner: "As the temperature of the solder paste on the interconnect passes the solder alloy's melting point and the solder enters a molten state, the assembly enters the reflow region of the process. For 63 Sn/37 Pb, a eutectic solder and the most common SMT alloy, reflow occurs at 183 degrees C." Phillip Zarrow, *Convection/Infrared and Convection Dominant Reflow Soldering of Fine Pitch SMT Devices*, Section 10.3.3 (1994). However, that same paper later describes the solder reflow process as taking the temperature of the solder above liquidus: "Most solder manufacturers recommend bringing the interconnection temperature approximately 15 to 25 degrees C above the alloy melting point to achieve full liquidus and assure good solder flow and aid fillet

formation." *Id.*

Memorandum of Plaintiff Vitronics Corporation in Opposition to Motion for Summary Judgment of Defendant Conceptronic Corporation and In Support of Plaintiff's Cross-Motion for Summary Judgment of Patent Validity and Infringement In its brief supporting its proposed construction of claim 1, both at the trial court level and here on appeal, Conceptronic similarly relied on a memorandum written by Vitronics which contains the following language: "Tin/lead solders commonly used by the electronic products industry have a 'liquidus' or 'reflow' temperature in the order of 183 degrees C, or about 361 degrees F." However, this phrase is in the background section of the memorandum and later in the same memorandum, Vitronics discussed the issue of infringement as being whether the temperature of the devices was maintained below "the temperatures of the leads at which the solder is reflowing."

Without indicating which evidence it relied upon, the district court simply ruled that solder reflow temperature meant 183 degrees C.

ANALYSIS

The Use of Intrinsic and Extrinsic Evidence in Claim Construction

A literal patent infringement analysis involves two steps: the proper construction of the asserted claim and a determination as to whether the accused method or product infringes the asserted claim as properly construed. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (in banc), *aff'd*, ___ U.S. ___, 116 S. Ct. 1384, 1393 [38 USPQ2d 1461] (1996); *Hormone Research Found., Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1562, 15 USPQ2d 1039, 1042 (Fed. Cir. 1990), *cert. dismissed*, 499 U.S. 955 (1991). The first step, claim construction, is a matter of law, which we review *de novo*. *Markman*, 52 F.3d at 979, 34 USPQ2d at 1329 . Claim construction is the only step in the infringement analysis at issue in this appeal. [FN4]

In determining the proper construction of a claim, the court has numerous sources that it may properly utilize for guidance. These sources have been detailed in our previous opinions, as discussed below, and include both intrinsic evidence (*e.g.*, the patent specification and file history) and extrinsic evidence (*e.g.*, expert testimony).

It is well-settled that, in interpreting an asserted

claim, the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history. *See Markman*, 52 F.3d at 979, 34 USPQ2d at 1329 . Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language.

First, we look to the words of the claims themselves, both asserted and nonasserted, to define the scope of the patented invention. *See Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620, 34 USPQ2d 1816, 1819 (Fed. Cir. 1995). Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history. *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed. Cir. 1996) ("A technical term used in a patent document is *1577 interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning.") (citations omitted); *Hormone*, 904 F.2d at 1563, 15 USPQ2d at 1043 ("It is a well-established axiom in patent law that a patentee is free to be his or her own lexicographer and thus may use terms in a manner contrary to or inconsistent with one or more of their ordinary meanings.") (citations omitted).

Thus, second, it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication. *Markman*, 52 F.3d at 979, 34 USPQ2d at 1330 . As we have repeatedly stated, "[c]laims must be read in view of the specification, of which they are a part." *Id.* at 979, 34 USPQ2d at 1329 . The specification contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it. Thus, the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.

Third, the court may also consider the prosecution history of the patent, if in evidence. *Id.* at 980, 34 USPQ2d at 1330 ; *Graham v. John Deere*, 383 U.S. 1, 33, 148 USPQ 459, 473 (1965). This history contains

the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. As such, the record before the Patent and Trademark Office is often of critical significance in determining the meaning of the claims. See *Markman*, 52 F.3d at 980, 34 USPQ2d at 1330; *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.") (citations omitted). Included within an analysis of the file history may be an examination of the prior art cited therein. *Autogiro Co. of America v. United States*, 384 F.2d 391, 399, 155 USPQ 697, 704 (Ct. Cl. 1967) ("In its broader use as source material, the prior art cited in the file wrapper gives clues as to what the claims do not cover.").

In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence. See, e.g., *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1216, 36 USPQ2d 1225, 1228 (Fed. Cir. 1995) ("In construing the claims we look to the language of the claims, the specification, and the prosecution history. Extrinsic evidence may also be considered, *if needed* to assist in determining the meaning or scope of technical terms in the claims.") (citations omitted, emphasis added); *Hormone*, 904 F.2d at 1562, 15 USPQ2d at 1043 ("Claim interpretation involves a review of the specification, the prosecution history, the claims (including unasserted as well as asserted claims), and, *if necessary*, other extrinsic evidence, such as expert testimony.") (citations omitted, emphasis added). In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. The claims, specification, and file history, rather than extrinsic evidence, constitute the public record of the patentee's claim, a record on which the public is entitled to rely. In other words, competitors are entitled to review the public record, apply the established rules of claim construction, ascertain the scope of the patentee's claimed invention and, thus, design around the claimed invention. See *Markman*, 52 F.3d at 978-79, 34 USPQ2d at 1329. Allowing the public record to be altered or changed by extrinsic evidence introduced at trial, such as expert testimony, would make this right meaningless. See *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ("A patentee may not proffer an interpretation for the purposes of

litigation that would alter the indisputable public record consisting of the claims, the specification and the prosecution history, and treat the claims as a 'nose of wax.' " (quoting *Senmed, Inc. v. Richard- Allan Med. Indus., Inc.*, 888 F.2d 815, 819 n.8, 12 USPQ2d 1508, 1512 n.8 (Fed. Cir. 1989)). The same holds true whether it is the patentee or the alleged infringer who seeks to alter the scope of the claims.

The Proper Construction of the Claim Term "Solder Reflow Temperature"

[1] As can be readily seen from those portions of the specification set forth above, the meaning of the disputed term "solder reflow temperature" in claim 1 of the '502 patent is clear from a reading of the claim itself and the patent specification. The "peak reflow temperature" and "liquidus temperature" are clearly defined in the specification *1578 as having distinctly different meanings. Specifically, for the solders described in the specification, liquidus temperature is about 190 degrees C and the peak reflow temperature is about 210 degrees to 218 degrees C. Moreover, in the preferred embodiment described in the patent, the solder is heated to a temperature of 210 degrees C but the temperature of the devices is maintained at approximately 195 degrees C, *i.e.*, below the peak reflow temperature (210 degrees C) but above the liquidus temperature (190 degrees C). Therefore, in order to be consistent with the specification and preferred embodiment described therein, claim 1 must be construed such that the term "solder reflow temperature" means the peak reflow temperature, rather than the liquidus temperature. Indeed, if "solder reflow temperature" were defined to mean liquidus temperature, a preferred (and indeed only) embodiment in the specification would not fall within the scope of the patent claim. Such an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support, which is wholly absent in this case. See *Modine Mfg. Co. v. United States Int'l Trade Comm'n*, 75 F.3d 1545, 1550, 37 USPQ2d 1609, 1612 (Fed. Cir. 1996); see also *Hoechst*, 78 F.3d at 1581, 38 USPQ2d at 1130 ("We share the district court's view that it is unlikely that an inventor would define the invention in a way that excluded the preferred embodiment, or that persons of skill in this field would read the specification in such a way."). *The District Court's Reliance on Extrinsic Evidence*

Since the claim, read in light of the patent specification, clearly uses the term "solder reflow temperature" to mean the peak reflow temperature,

rather than the liquidus temperature, that should have been the end of the trial court's analysis. [FN5] Only if there were still some genuine ambiguity in the claims, after consideration of all available intrinsic evidence, should the trial court have resorted to extrinsic evidence, such as expert testimony, in order to construe claim 1. Moreover, even if the judge permissibly decided to hear all the possible evidence before construing the claim, the expert testimony, which was inconsistent with the specification and file history, should have been accorded no weight. *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ; *Markman*, 52 F.3d at 983, 34 USPQ2d at 1333 .

Here, the trial judge considered not only the specification, but also expert testimony and other extrinsic evidence, such as the paper written by the former Vitronics employee. No doubt there will be instances in which intrinsic evidence is insufficient to enable the court to determine the meaning of the asserted claims, and in those instances, extrinsic evidence, such as that relied on by the district court, may also properly be relied on to understand the technology and to construe the claims. *See Markman*, 52 F.3d at 979, 34 USPQ2d at 1329 . Extrinsic evidence is that evidence which is external to the patent and file history, such as expert testimony, inventor testimony, dictionaries, and technical treatises and articles. [FN6] *Id.* at 980, 34 USPQ2d at 1330 . However, as we have recently re-emphasized, extrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. *Id.* at 981, 34 USPQ2d at 1331 . Nor may it contradict the import of other parts of the specification. Indeed, where the patent documents are unambiguous, expert testimony regarding the meaning of a claim is entitled to no weight. *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 . "Any other rule would be unfair to competitors who must be able to rely on the patent documents themselves, without consideration of expert opinion that then does not even exist, in ascertaining the scope of a patentee's right to exclude." *Id.* at 1578, 34 USPQ2d at 1678-79 . Nor may the inventor's subjective intent as to claim scope, when unexpressed in the patent documents, have any effect. Such testimony cannot guide the court to a proper interpretation when the patent documents themselves do so clearly.

In addition, a court in its discretion may admit and rely on prior art proffered by one of the parties, whether or not cited in the specification or the file

history. This prior art can often help to demonstrate how a disputed term is used by those skilled in the art. Such art may make it unnecessary to rely on expert testimony and may save much trial *1579 time. As compared to expert testimony, which often only indicates what a particular expert believes a term means, prior art references may also be more indicative of what all those skilled in the art generally believe a certain term means. Once again, however, reliance on such evidence is unnecessary, and indeed improper, when the disputed terms can be understood from a careful reading of the public record. *See Kearns v. Chrysler Corp.*, 32 F.3d 1541, 1547, 31 USPQ2d 1746, 1750 (Fed. Cir. 1994). Nor may it be used to vary claim terms from how they are defined, even implicitly, in the specification or file history.

Unfortunately, here the trial judge did use the extrinsic evidence to vary or contradict the manifest meaning of the claims. The trial judge was presented with expert testimony and other evidence that some of those skilled in the relevant art, including certain Vitronics employees, *sometimes* used the term "solder reflow temperature" and "liquidus temperature" interchangeably. He apparently relied on this testimony in reaching his conclusion that, as used in claim 1, solder reflow temperature meant 183 degrees C. [FN7] However, regardless of how those skilled in the art would interpret a term in other situations, where those of ordinary skill, on a reading of the patent documents, would conclude that the documents preclude the term being given the meaning propounded by the expert witnesses, we must give it the meaning indicated by the patentee in the patent claim, specification and file history. Thus, expert testimony tending to show that those skilled in the art would, in certain circumstances, understand "solder reflow temperature" to mean the solder liquidus temperature is entitled to no weight in light of the clear contrary meaning shown in the specification. *See Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ("Even if Southwall could show that 'sputter-deposited dielectric' has a meaning to one skilled in the art different from the definition in the '745 specification and file history, the definition in the patent documents controls the claim interpretation."). Because the specification clearly and unambiguously defined the disputed term in the claim, reliance on this extrinsic evidence was unnecessary and, hence, legally incorrect.

[2] Had the district court relied on the expert testimony and other extrinsic evidence solely to help it understand the underlying technology, we could not say the district court was in error. But testimony

on the *technology* is far different from other expert testimony, whether it be of an attorney, a technical expert, or the inventor, on the *proper construction* of a disputed claim term, relied on by the district court in this case. The latter kind of testimony may only be relied upon if the patent documents, taken as a whole, are insufficient to enable the court to construe disputed claim terms. Such instances will rarely, if ever, occur. Indeed, this case did not present such an instance. Even in those rare instances, prior art documents and dictionaries, although to a lesser extent, are more objective and reliable guides. Unlike expert testimony, these sources are accessible to the public in advance of litigation. They are to be preferred over opinion testimony, whether by an attorney or artisan in the field of technology to which the patent is directed. Indeed, opinion testimony on claim construction should be treated with the utmost caution, for it is no better than opinion testimony on the meaning of statutory terms. *See Markman*, 52 F.3d at 983, 34 USPQ2d at 1332- 33 ("First, the testimony of Markman and his patent attorney on the proper construction of the claims is entitled to no deference. . . . This testimony about construction, however, amounts to no more than legal opinion -- it is precisely the process of construction that the court must undertake.").

Other Issues

Conceptronic further argues that, even if we were to reverse the district court's decision regarding the proper interpretation of the term "solder reflow temperature," the district court's ultimate conclusion of no infringement as a matter of law can still be affirmed on the alternative ground that Vitronics' evidence does not prove infringement because Vitronics failed to test the temperature of all of the various devices on the boards and because certain of the Vitronics tests demonstrated that many of the devices reached temperatures above the peak reflow temperature. Vitronics, of course, disputes these assertions and points to supporting documentation to the effect that the Conceptronic ovens do indeed maintain the temperature of the devices below peak reflow temperature. The trial court made no decision on this issue. Moreover, such a determination at this stage would require our weighing substantial *1580 but conflicting evidence, an impermissible exercise for an appellate court. Accordingly, we must remand.

CONCLUSION

For all the foregoing reasons, the judgment of non-

infringement as a matter of law is reversed and the case is remanded for further proceedings consistent with this opinion. *REVERSED AND REMANDED*

COSTS

Costs in favor of Vitronics.

FN1 A jury returned a verdict of non-infringement of the '301 patent. Vitronics does not appeal that verdict.

FN2 Whether the Conceptronic ovens utilize nonfocused infrared panel emitters is not before this court.

FN3 The specification of the '502 patent describes three exemplary types of solder which can be used in the solder reflow process -- 60/40 (Sn/Pb), 63/37 (Sn/Pb) and 66/2 (Sn/Pb/Ag) -- each of which, it indicates, has a liquidus temperature of about 190 degrees C and a peak reflow temperature of about 210 degrees to 218 degrees C. At trial, the parties appear to have discussed only 63/37 (Sn/Pb) solder, which has a liquidus temperature of 183 degrees C. However, the claims are not limited to that particular solder or a solder with that particular liquidus temperature.

FN4 No assertion was made that defendant infringed under the doctrine of equivalents.

FN5 The file history was apparently not put into evidence.

FN6 Although technical treatises and dictionaries fall within the category of extrinsic evidence, as they do not form a part of an integrated patent document, they are worthy of special note. Judges are free to consult such resources at any time in order to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.

FN7 Although the trial judge's reasoning does not appear in the record, he must have relied on the testimony presented by Conceptronic that "solder reflow temperature" and "liquidus temperature" were synonymous and the undisputed testimony that the liquidus temperature of 63/37 (Sn/Pb) solder is 183 degrees C.

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39 U.S.P.Q.2d 1573

END OF DOCUMENT

Appendix 5: *Crown Operations Intl. v. Solutia, Inc.*, 289 F.3d 1367, 62 U.S.P.Q.2d 1917 (Fed. Cir. 2002)

Crown Operations International Ltd.
v.
Solutia Inc.

U.S. Court of Appeals Federal Circuit

No. 01-1144

Decided May 13, 2002

PATENTS

[1] Patentability/Validity -- Anticipation -- Prior art (§ 115.0703)

Patentability/Validity -- Obviousness -- Relevant prior art -- In general (§ 115.0903.01)

Patent directed to solar and safety control glass with minimal visual distortion is not anticipated by prior art patent, since invention addresses visual distortion problem by limiting visible reflectance contribution of solar control film layer to no more than about 2 percent, whereas prior patent does not discuss or disclose 2 percent limitation, since prior reference will not be assumed to inherently contain claimed property merely because it discloses same structure, and since declaratory plaintiff has not presented sufficient evidence to rebut presumption of validity and defendant's facial evidence that prior patent does not disclose 2 percent limitation; patent is not obvious in light of prior art, since plaintiff has not shown that prior art contains teaching, suggestion, or motivation to reduce reflectance contribution to about 2 percent.

[2] Patentability/Validity -- Specification -- Enablement (§ 115.1105)

Genuine issue of fact exists as to whether patent in suit, directed to elimination of optical distortion in solar and safety control glass, is invalid for lack of enablement, since patent teaches measurement of texture of solar film layer in glass by calculating "wave index" using average amplitude and average pitch, but amplitude is not defined in patent, since person of ordinary skill in art would recognize several ways to measure amplitude, since amplitude directly impacts wave index calculation, and varying amplitude measurements produces range of wave index results, since novel aspects of invention must not be left to inference, since patent does not specify boundaries for average pitch and amplitude used to calculate wave index, leaving open possibility of range of embodiments that meet limitation but are inoperative, and since patent's rules for determining which wave peaks and valleys are small enough to be eliminated from index calculation are ambiguous.

PATENTS

Particular patents -- General and mechanical -- Safety and solar film for glass

4,973,511, Farmer, Ho, Riek, and Woodard, composite solar/safety film and laminated window assembly made therefrom, summary judgment that patent is not invalid affirmed.

5,091,258, Moran, laminate for a safety glazing, summary judgment that patent is not invalid for lack of enablement reversed.

*1918 Appeal from the U.S. District Court for the Western District of Wisconsin, Shabaz, S.J.

Action by Crown Operations International Ltd. and Marshall H. Krone against Solutia Inc. for declaratory judgment that defendant's patents are invalid. Plaintiffs appeal from grant of summary judgment in favor of defendant. Affirmed as to patent no. 4,973,511; reversed and remanded as to patent no. 5,091,258.

Joseph T. Leone and Joseph A. Ranney, of DeWitt, Ross, and Stevens, Madison, Wis., for plaintiffs-appellants.

Gregory E. Upchurch, Kenneth R. Heineman, and Dudley W. Von Holt, of Thompson Coburn, St. Louis, Mo., for defendant-appellee.

Before Lourie, Clevenger, and Gajarsa, circuit judges.

Gajarsa, J.

Crown Operations International, Ltd., and Mr. Marshall H. Krone (collectively "Crown"), appeal the decision of the United States District Court for the Western District of Wisconsin denying Crown declaratory relief that Solutia's U.S. Patent No. 4,973,511 ("the '511 patent") is invalid for lack of novelty and non-obviousness, and that Solutia's U.S. Patent No. 5,091,258 ("the '258 patent") is invalid for lack of enablement and written description. *Crown Operations Int'l, Ltd. v. Solutia, Inc.*, No. 99-C-802-S, slip op. at 8 (W.D. Wis. Aug. 30, 2000) (memorandum decision and order granting summary judgment) ("August 30 Order"); *Crown Operations Int'l, Ltd. v. Solutia, Inc.*, No. 99-C-802-S, slip op. at 24, 27 (W.D. Wis. Aug. 22, 2000) (same) ("August 22 Order"). Because we find no error in the district court's opinion with respect to the '511 patent, we affirm that portion

of the district court's decision. However, because the district court erred in its analysis of enablement for the '258 patent, and did not address the written description issue for the '258 patent, we reverse the district court's grant of summary judgment on that issue and remand for additional proceedings consistent with this opinion.

I. BACKGROUND

The patents at issue in this appeal relate to layered films used to create safety and solar control glass. An example is an automobile windshield. Most windshields have two layers of glass with a multi-layer film between the glass layers. The multi-layer film adds properties to the glass assembly, such as impact resistance or providing a conductive layer that facilitates defrosting the windshield. An inner layer of the film has solar control properties to selectively reflect, absorb (and thus convert to heat) or transmit defined percentages of certain wavelengths of light. This inner layer is called the solar control film. It is made of a substrate coated by one or more layers of metal or metallic substances. '511 patent, col. 3, l. 64 to col. 4, l. 2. Typically, manufacturers laminate the solar control film between layers of plasticized polyvinyl butyral ("PVB") (sometimes called the "safety film") in a process known as encapsulation. Then, the encapsulated solar control film is sandwiched between two pieces of glass for a final assembly of multi-layer glass with safety and solar control properties.

A. The '511 Patent

The '511 patent is directed to the problem that the metal-coated substrate, *i.e.*, solar control film, tends to wrinkle during encapsulation causing visual distortions. The '511 patent claims to mask the wrinkles from detection by the human eye by limiting to two percent or less the visible light reflection contribution of the solar control film compared to reflection from a complete assembly of glass, PVB and solar control film. '511 patent, col. 4, ll. 46-49, col. 8, l. 66 to col. 9, l. 6, col. 14, l. 67 to col. 15, l. 2. Figure 1 from the '511 patent, set forth below, shows the layers in a complete assembly.

TABULAR OR GRAPHIC MATERIAL SET AT THIS POINT IS NOT DISPLAYABLE

The complete safety and solar control glass assembly 10 includes two outer glass layers 28 & 30, PVB layers 22 & 23, and the solar control film 20. The solar control film is comprised of a substrate layer 16 and

solar control coating 18. '511 patent, col. 3, ll. 41-53, col. 7, ll. 2-4, col. 10, l. 15. Figure 3 from the '511 *1919 patent, set forth below, shows the sub-layers of the solar control coating 18.

TABULAR OR GRAPHIC MATERIAL SET AT THIS POINT IS NOT DISPLAYABLE

Layer 18 is made of multiple sub-layers. Layers 34 and 36 are metal oxide, and layer 38 is metal. '511 patent, col. 5, ll. 12-14. In addition, the '511 patent notes that "[p]rior automotive windshields have visible light reflection contributions for their solar films of three percent or greater." Further, it relates that the primary method of achieving a low solar control film reflectance contribution is by providing a specially-designed solar coating. '511 patent, col. 4, ll. 56-65.

On December 16, 1999, Crown sued Solutia (the "Initial Complaint"), seeking, among various other relief, a declaration that the '511 patent was invalid for anticipation and obviousness. Upon the parties' cross-motions for summary judgment, the district court found the '511 patent not anticipated and not invalid for obviousness. *August 22 Order* at 24, 27. We discuss herein only those portions of the *August 22 Order* relevant to the issues on appeal, which relate solely to the summary judgment finding that the '511 patent was not invalid on the grounds of anticipation and obviousness.

Claim 1, the only independent claim of the '511 patent, is set forth below, with the element numbers from Figure 1 inserted into the claim.

1. A composite solar/safety film [24]for use in a laminated window assembly [10] comprising:

a flexible, transparent plastic substrate layer [16] having a carrier surface and an opposing back surface;

a multilayer solar control coating [18] on said carrier surface, said coated substrate defining a solar control film [20]; and

at least one flexible, transparent, energy absorbing plastic safety layer [23 and/or 22] bonded to a surface of said solar control film;

wherein said solar control film contributes no more than about 2% visible reflectance, based on total visible incident radiation, in a laminated window assembly containing said composite solar/safety film laminated to at least one rigid transparent member [30]

and/or 28].

'511 patent, col. 14, l. 57 to col. 15, l. 4 (emphasis added and emphasized numbers added to identify elements shown in Figure 1 above).

Crown argued that U.S. Patent No. 4,017,661 to Gillery (the "Gillery patent") anticipates the '511 patent. The district court held otherwise, because, while the Gillery patent discloses the first three limitations of claim 1 of the '511 patent, it does not disclose the two percent visible reflectance limitation. The court found that neither the Gillery patent claims nor its description expressly disclose a two percent limit on reflectance contribution from the solar control film layer. Crown argued that the two percent limitation was inherently present in the Gillery patent's teachings because the Gillery patent disclosed an assembly with PVB layers, substrate layer, and substrate metal-coating--arguably of the same composition and thickness of the films disclosed by the '511 patent. Thus, Crown argued, because the structure, thickness and materials of the assembly were the same or within the same range(s), the Gillery patent must inherently disclose a two percent limitation. The district court rejected this argument because it found that none of the embodiments disclosed by the Gillery patent meet the two percent visible light reflectance limit. [FN1]

In its *August 22 Order*, the district court also held that the '511 patent was not rendered invalid for obviousness by Gillery or the other prior art cited by Crown because no prior art discloses: (i) that reflectance below two percent will mask wrinkles; (ii) a solar control film layer with reflectance below two percent; or (iii) any suggestion, motivation or teaching to reduce solar control film visible light reflectivity below two percent. Although the prior art generally sought to reduce visible light reflectivity, it also taught disadvantages of a very thin metal-coating on the substrate, including sacrificing infrared reflectivity. Thus, it taught that the proper compromise to *1920 achieve the conflicting goals of infrared (non-visible light) reflectance, visible light transmission and conductivity was a solar control film with a visible light reflectivity greater than two percent.

B. The '258 Patent

The '258 patent is directed at eliminating optical distortion, called "applesauce," in safety and solar control glass assemblies of the type discussed above for the '511 patent. The '258 patent discloses a method

to control distortion otherwise caused by the safety and solar film layer by measuring and controlling the texture of the surface of the PVB layers. The method expresses texture using a "wave index" and a "roughness value." The wave index calculation is at issue in this appeal. Wave index indicates the relative waviness of the surface of the PVB. Determining wave index involves measuring the surface of the PVB and then aggregating the measurements into a single number, the wave index, through a calculation purportedly described in the '258 patent.

The '258 patent directs one to use an instrument to physically measure the waviness of the surface of the PVB and capture the measurement into an electronic "trace line" representing the contours of the PVB surface. '258 patent, col. 7, ll. 54-65. Since the "trace line" is stored electronically, a computer program is used to calculate wave index from the trace. Three figures from the '258 patent, given below, provide examples of PVB surface trace lines.

TABULAR OR GRAPHIC MATERIAL SET AT THIS POINT IS NOT DISPLAYABLE

The rules for calculating the wave index implement a "smoothing" function. The smoothing process seeks to eliminate minor inflection points (peaks or valleys) to simplify the calculation of wave index. '258 patent, col. 7, l. 66 to col. 8, l. 2.

In the Initial Complaint, Crown sought a declaration that the '258 patent was invalid for anticipation and obviousness. Then, on May 26, 2000, Crown amended the complaint (the "Amended Complaint") to additionally claim in Count VI that the '258 patent is invalid under 35 U.S.C. § 112, first paragraph, because it lacked enablement and written description due to ambiguities in the disclosed wave index calculation. In its *August 22 Order*, the district court found the '258 patent not anticipated and not invalid for obviousness. *August 22 Order* at 28-29.

With respect to Count VI of Crown's amended complaint, Solutia moved for summary judgment on Crown's enablement and written description claim. Crown opposed Solutia's summary judgment motion, arguing that the '258 patent did not meet the enablement and written description requirements. The district court found the '258 patent not invalid for lack of enablement, but did not discuss in its opinion the written description requirement. *August 30 Order* at 8-13. We discuss herein only those portions of the *August 30 Order* relevant to the issues on appeal,

which relate to summary judgment finding the '258 patent not invalid on the grounds of enablement and the procedural disposition of the written description issue.

Claim 1 of the '258 patent is set forth below. In the language of this claim, "laminate" refers to the complete glass, PVB and solar control film assembly, and "functional performance layer" refers to the solar control coating. '258 patent, col. 3, ll. 45-65.

I. A laminate which is substantially free of reflected distortion when used in a safety glazing comprising:

a transparent, thermoplastic substrate layer, optionally surface treated or coated, bearing one or more functional performance layers; and

at least one layer of plasticized polyvinyl butyral bonded on one side to a functional performance layer or the substrate layer and having a roughened deairing surface on its other side characterized by a roughness value, Rz, of at least 10 micrometers;

said at least one plasticized polyvinyl butyral [PVB] layer, before bonding to the substrate layer or functional performance layer, *possessing low surface waviness on each side characterized by a wave index *1921 value, WI, of less than 15,000 square micrometers.*

'258 patent, col. 12, ll. 2-16 (emphasis added).

Crown argued that the rules disclosed by the '258 patent for calculating wave index are not sufficiently precise to enable a person of ordinary skill in the art to practice the '258 patent without undue experimentation. The wave index calculation as described by the '258 patent is set forth below.

In this regard, considering the waviness profile as a series of peaks and valleys, the smoothing rules of the program consider an inflection point to be a true peak or valley if it is: i) at least 100 micrometers away from the immediately preceding prior peak or valley and ii) at least 0.5 micrometer above or below the immediately preceding prior peak or valley, a valley being at least 0.5 micrometer below the immediately preceding prior peak. Pitch (P) is the distance between one valley and the next valley or in other words across the base of a peak. Average amplitude (H avg) and average pitch (P avg) are determined by the program for the smoothed trace of ten 12.5 mm tracing lengths (the second five lengths being 90o to the first five

lengths). From the average of the averaged H's and P's, a WI value is computed from the equation: Wave Index (WI) = (H avg) x (P avg) where H avg and P avg are in microns.

'258 patent, col. 8, ll. 3-19.

Crown asserted that according to the disclosed wave index "calculation," one of ordinary skill in the pertinent art would not know whether to instruct the smoothing program to disregard a peak by comparing it to an immediately preceding peak, or to a valley. The district court held that common sense and the clarifying clause "a valley being at least 0.5 micrometer below the immediately preceding prior peak" defeated Crown's argument. Thus, the district court held that the alleged grammatical ambiguities in the rules disclosed for calculating wave index did not invalidate the patent for lack of enablement.

Crown timely appealed the district court's two orders, raising the issues of anticipation and obviousness of the '511 patent, and lack of enablement and written description of the '258 patent. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. STANDARD OF REVIEW

We review a district court's grant of summary judgment without deference. *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1378, 53 USPQ2d 1225, 1227 (Fed. Cir. 1999). Summary judgment is appropriate when the moving party demonstrates that "there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c); *Celotex Corp. v. Catrett*, 477 U.S. 317, 322-23 (1986). On summary judgment, the evidence must be viewed in the light most favorable to the party opposing the motion, *Poller v. Columbia Broad. Sys., Inc.*, 368 U.S. 464, 473 (1962), with doubts resolved in favor of the nonmovant, *Cantor v. Detroit Edison Co.*, 428 U.S. 579, 582 (1976); *Transmatic, Inc. v. Gulton Indus., Inc.*, 53 F.3d 1270, 1274, 35 USPQ2d 1035, 1038 (Fed. Cir. 1995). Once the moving party has satisfied its initial burden, the opposing party must establish a genuine issue of material fact and cannot rest on mere allegations, but must present actual evidence. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986). Issues of fact are genuine only "if the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Id.* A disputed fact is material if it might affect the outcome of the suit such that a finding of that fact is necessary and relevant to the

proceeding. *Id.*; *General Mills, Inc. v. Hunt-Wesson, Inc.*, 103 F.3d 978, 980, 41 USPQ2d 1440, 1442 (Fed. Cir. 1997).

A patent is invalid for anticipation when the same device or method, having all of the elements contained in the claim limitations, is described in a single prior art reference. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 894, 221 USPQ 669, 673 (Fed. Cir. 1984). An anticipating reference must describe the patented subject matter with sufficient clarity and detail to establish that the subject matter existed in the prior art and that such existence would be recognized by persons of ordinary skill in the field of the invention. *See In re Spada*, 911 F.2d 705, 708, 15 USPQ 1655, 1657 (Fed. Cir. 1990); *Diversitech Corp. v. Century Steps, Inc.*, 850 F.2d 675, 678, 7 USPQ2d 1315, 1317 (Fed. Cir. 1988).

Obviousness is a legal conclusion based on underlying facts of four general types, all of *1922 which must be considered by the trier of fact: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) any objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 [148 uspq 459] (1966); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1270, 20 USPQ2d 1746, 1750-51 (Fed. Cir. 1991); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-68, 1 USPQ2d 1593, 1594 (Fed. Cir. 1987).

"Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546, 48 USPQ2d 1321, 1329 (Fed. Cir. 1998). There must be a teaching or suggestion within the prior art, within the nature of the problem to be solved, or within the general knowledge of a person of ordinary skill in the field of the invention, to look to particular sources, to select particular elements, and to combine them as combined by the inventor. *See Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 665, 57 USPQ2d 1161, 1167 (Fed. Cir. 2000); *ATD Corp.*, 159 F.3d at 546, 48 USPQ2d at 1329; *Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed. Cir. 1994) ("When the patented invention is made by combining known components to achieve a new system, the prior art must provide a suggestion or

motivation to make such a combination.").

The written description inquiry is a factual one and must be assessed on a case-by-case basis. *See Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1561, 19 USPQ2d 1111, 1116 (Fed. Cir. 1991) (quoting *In re Smith*, 458 F.2d 1389, 1395, 173 USPQ 679, 683 (CCPA 1972) ("Precisely how close the original description must come to comply with the description requirement of § 112 must be determined on a case-by-case basis.")). In order to satisfy the written description requirement, the disclosure as originally filed does not have to provide in haec verba support for the claimed subject matter at issue. *See Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570, 39 USPQ2d 1895, 1904 (Fed. Cir. 1996). Nonetheless, the disclosure must convey with reasonable clarity to those skilled in the art that the inventor was in possession of the invention, *Vas-Cath Inc.*, 935 F.2d at 1563-64, 19 USPQ2d at 1116-17, although we have also clarified that the possession test alone is not always sufficient to meet the written description requirement, *Enzo Biochem, Inc. v. Gen-Probe Inc.*, No. 01-1230, 2002 WL 487156, at *7 (Fed. Cir. Apr. 2, 2002). As such, "the written description requirement is satisfied by the patentee's disclosure of 'such descriptive means as words, structures, figures, diagrams, formulas, etc., that fully set forth the claimed invention.'" *Enzo Biochem*, 2002 WL at *7 (quoting *Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997)). Put another way, one skilled in the art, reading the original disclosure, must reasonably discern the limitation at issue in the claims. *Waldemar Link GmbH & Co. v. Osteonics Corp.*, 32 F.3d 556, 558, 31 USPQ2d 1855, 1857 (Fed. Cir. 1994).

Whether a claim is enabled under 35 U.S.C. § 112, first paragraph is a question of law, although based upon underlying factual findings. *See PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1564, 37 USPQ2d 1618, 1623 (Fed. Cir. 1996); *In re Goodman*, 11 F.3d 1046, 1049-50, 29 USPQ2d 2010, 2013 (Fed. Cir. 1993).

III. DISCUSSION

A. The '511 Patent

On appeal, Crown describes various purported errors in the district court's analysis of the validity of the '511 patent. Despite Crown's contentions, we ascertain no error requiring reversal of the district court's determination of validity over Crown's claims of anticipation and obviousness.

] Regarding alleged anticipation by the Gillery patent, on its face the Gillery patent does not disclose or discuss a two percent limitation for the reflectance contribution of the solar control film. Crown maintains that the '511 patent merely claims a preexisting property inherent in the structure disclosed in the prior art. Crown urges us to accept the proposition that if a prior art reference discloses the same structure as claimed by a patent, the resulting property, in this case, two percent solar control film reflectance, should be assumed. We decline to adopt this approach because this proposition is not in accordance with our cases on inherency. If the two percent reflectance limitation is inherently *1923 disclosed by the Gillery patent, [FN2] it must be necessarily present and a person of ordinary skill in the art would recognize its presence. *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999); *Continental Can*, 948 F.2d at 1268, 20 USPQ2d at 1749. Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 USPQ2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981)).

In arguing inherent disclosure of the two percent limitation in the Gillery patent, Crown bears an evidentiary burden to establish that the limitation was necessarily present. [FN3] The moving party in a summary judgment motion has the burden to show "that there is an absence of evidence to support the non-moving party's case;" the non-moving party must affirmatively demonstrate by specific factual allegations that a genuine issue of material fact exists for trial. *Celotex Corp. v. Catrett*, 477 U.S. 317, 322-23 (1986). A patent enjoys a presumption of validity, *see* 35 U.S.C. § 282, which can be overcome only through clear and convincing evidence, *see United States Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1563, 41 USPQ2d 1225, 1232 (Fed. Cir. 1997). Given the presumption of validity afforded the '511 patent, Crown has failed to meet its burden because it has not presented sufficient evidence to rebut the facial evidence offered by Solutia that the Gillery patent does not disclose the two percent limitation. *See Eli Lilly & Co. v. Barr Lab. Inc.*, 251 F.3d 955, 962, 58 USPQ2d 1869, 1874 (Fed. Cir. 2001) ("[A] moving party seeking to have a patent held not invalid at summary judgment must show that the nonmoving party, who bears the burden of proof at trial, failed to produce clear and convincing evidence on an essential element of a defense upon which a reasonable jury could

invalidate the patent."); *In re Robertson*, 169 F.3d at 745 (recognizing that extrinsic evidence may be required to establish inherency). Instead, Crown offers only an assumption and its own contentions. [FN4]

Crown also argues that the district court erred by comparing reflectance values in the Gillery patent to non-corresponding values in the '511 patent. *August 22 Order* at 23-24. While perhaps the district court could have been more careful to explain the basis of its comparison, on a close reading of the district court's analysis we find that the alleged improper comparison only supported the district court's primary point - that no embodiment of the Gillery patent disclosed the two percent limitation, a conclusion that Crown has not shown to be in error.

Finally, Crown argues that various prior art references invalidate the '511 patent as obvious in view of such prior art. Crown's arguments lack merit because it has not shown that the prior art contains a teaching, suggestion or motivation to reduce the reflectance contribution of the solar control film to "no more than about two percent," and the district court properly concluded that there was no such teaching, suggestion or motivation in the prior art cited by Crown. *See Ruiz*, 234 F.3d at 665, 57 USPQ2d at 1167; *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

B. The '258 Patent

On appeal, Crown argues that the district court erred in analyzing the impact of the ambiguities in the wave index calculation on the enablement requirement for the '258 patent. In *1924 addition to its enablement attack, Crown also argues that the '258 patent does not meet the written description requirement of § 112, first paragraph.

The two requirements, while related and springing from the same factual predicates, [FN5] each carry a separate purpose. The purpose of the enablement requirement is to "ensure[] that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims." *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys.*, 166 F.3d 1190, 1196, 49 USPQ2d 1671, 1675 (Fed. Cir. 1999). One of our predecessor courts has held the enablement and written description requirements to be separate and distinct, and has held that a "specification may contain a disclosure that is sufficient to enable one skilled in the art to make and use the invention and yet fail to comply with the description of the invention

requirement." *In re Barker and Pehl*, 559 F.2d 588, 591, 194 USPQ 470, 472 (CCPA 1977). Subsequently, this court has held that the purpose of the written description is distinct from merely explaining how to make and use the invention. *See Enzo Biochem*, 2002 WL at *7-8; *Vas-Cath*, 935 F.2d at 1563-64, 19 USPQ2d at 1117. In light of the odd procedural setting of the written description issue in this appeal, our disposition of this appeal based on enablement, and given that the two requirements are distinct and each are necessary, we do not reach the written description issue except to note that it appears to remain available for adjudication or disposition by the district court on remand. [FN6]

Turning to the enablement issue, we agree with Crown that the ambiguities and lack of specified boundary conditions, and Crown's proffered evidence concerning the same, raise a genuine issue of material fact as to whether a person of ordinary skill in the pertinent art could make or use the invention of the '258 patent [FN7] without undue experimentation. *White Consol. Indus. v. Vega Servo-Control*, 713 F.2d 788, 791, 218 USPQ 961, 963-64 (Fed. Cir. 1983). The district court found otherwise. However, it appears not to have considered the statements of Crown's expert concerning the effect of unspecified boundary conditions on the calculation of wave index.

] Following the reasoning of the district court, Solutia argues that a person of ordinary skill in the pertinent art could overcome any ambiguities in the wave index calculation without undue experimentation by testing a limited number of possibilities for computing the wave index. In response, Crown offers statements of its expert that the '258 patent does not define amplitude and that a person of ordinary skill in the art would not know whether to measure amplitude: (i) from a centerline running horizontally through the "middle" of the trace; (ii) from "peak-to-peak," i.e., from the bottom of a valley to the top of a peak; or (iii) from some other baseline or reference running horizontally somewhere through the trace. On its face, the '258 patent does not define amplitude. However, average amplitude directly impacts the wave index calculation because wave index is the result of multiplying average amplitude by average pitch. Simply put, the wave index calculation would produce two separate numbers *1925 if calculated with a centerline versus a "peak-to-peak" amplitude. Worse yet, a range of various wave index values are possible for amplitude baselines running horizontally somewhere through the trace at various locations. To

show that the wave index calculation is enabled, Solutia cites various details from the '258 patent concerning how to perform the test to generate a trace of the PVB surface to calculate wave index. However, Solutia does not present sufficient evidence to rebut Crown's demonstration of the amplitude ambiguity in the wave index calculation. This is so because: (i) the amplitude is a direct input to the critical claim limitation, a wave index of less than 15,000 square micrometers; and (ii) the novel aspects of the invention must be disclosed and not left to inference, that is, a patentee may not rely on the inference of a person of ordinary skill in the pertinent art to supply such novel aspects. *See Genentech Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366, 42 USPQ2d 1001, 1005 (Fed. Cir. 1997) (stating that the knowledge of a hypothetical person of ordinary skill in the art cannot be used to supply the patentable aspects of the invention).

Compounding the amplitude ambiguity, Crown also notes that the wave index is the result of two independently varying, unbounded terms: average pitch and average amplitude. On its face, this does not seem to be a problem. However, Crown's expert noted that because boundary conditions are not specified, the claim covers inoperative embodiments. For example, a wave index of 15,000 square micrometers results from an average height of 1000 micrometers multiplied by an average pitch of 15 micrometers. Yet, according to Crown's expert, an average height of 1000 micrometers would not be acceptable for the PVB. As with the amplitude ambiguity, the problem goes well beyond this single example because a full range of resulting inoperative embodiments are possible for values of average height and average pitch that, when multiplied, produce a wave index value that meets the limitation of the claim. Such inoperative embodiments do not necessarily invalidate the claim. *See Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569, 1576-77, 224 USPQ 409, 414 (Fed. Cir. 1984); *In re Cook*, 439 F.2d 730, 735, 169 USPQ 298, 302 (CCPA 1971) (noting that although claims may read on some inoperative embodiments, this does not necessarily invalidate the claim if the necessary information to limit the claims to operative embodiments is known to a person of ordinary skill in the art). [FN8] However, the inoperative embodiments support Crown's assertion that there is a genuine issue of material fact with respect to enablement. *See Atlas Powder*, 750 F.2d at 1576-77; *see also Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1358-59, 52 USPQ2d 1029, 1034-35 (Fed. Cir. 1999) (holding that the district court failed in its claim construction to

consider the effect of inoperative embodiments on invalidity due to lack of enablement). [FN9]

Further compounding the ambiguities with the wave index rules, the '258 patent's rules for determining which inflection points are "true" inflection points additionally support Crown's argument that it has raised a genuine issue of material fact. Crown demonstrated in various ways through its experts and arguments the potential indeterminacy in the rules. Solutia's expert admitted that there was some ambiguity in the rules with respect to whether a preceding peak or valley was the reference point in selecting a "true" peak or valley.

Solutia argues that even if the disclosed wave index calculation has ambiguities and is indeterminate, a person of ordinary skill in the pertinent art would be able to make and use the invention with some experimentation, but less than "undue" experimentation. Solutia argues that such a skilled person would only have to try two possibilities for amplitude, centerline and "peak- to-peak," and that experimenting to discover which of two possibilities to use is well within the boundary of undue experimentation. Crown counters that the amplitude ambiguity and potential inoperative embodiments, combined with the ambiguities in the smoothing rules, seems to suggest *1926 a wide range of possibilities which one must try. [FN10] With this wide range of possibilities, we agree that Crown has raised a genuine issue of material fact as to the amount and type of experimentation required, facts that will determine whether such experimentation is undue. See *Enzo Biochem Inc., v. Calgene Inc.*, 188 F.3d 1362, 1371, 52 USPQ2d 1129, 1135-36 (Fed. Cir. 1999) (holding that a reasonable amount of experimentation does not invalidate a patent, but undue experimentation does invalidate, and holding that the *Wands* factors, which determine whether a patent's disclosure is insufficient such that the experimentation required would be undue, apply to inter partes litigation). [FN11] While ultimately a trier of fact may reach the conclusion that any required experimentation is not undue, Crown has shown that sufficient potential for undue experimentation exists such that disposal on summary judgment is improper.

CONCLUSION

Because we hold that the '511 patent has not been shown to be invalid due to anticipation or obviousness and that a genuine issue of material fact exists with respect to facts underlying the determination of

enablement for the '258 patent, we affirm-in-part and reverse-in-part the district court's decision and remand for additional proceedings consistent with this opinion.

AFFIRMED-IN-PART, REVERSED-IN-PART, AND
REMANDED.

COSTS

Each party bears its own costs.

FN1. The district court, applying a similar analysis, also found that UK Patent Application GB 2 057 355 (the "UK patent") did not anticipate the '511 patent because it did not have the two percent limitation.

FN2. In order to claim "equivalent structure" between the Gillery patent and the '511 patent, Crown's inherency argument rests on a precondition of its own making - that the Gillery patent discloses use of TiO₂, even though it specifies TiO_x, where x is greater than 1.0 but less than 2.0. Although Crown vigorously argues this point, we do not reach this issue because even if Crown is correct that the structures are equivalent, Crown's inherency argument fails for the reasons set forth herein.

FN3. Crown's reliance on *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 36 USPQ2d 1225 (Fed. Cir. 1995), and *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 42 USPQ2d 1777 (Fed. Cir. 1997), to characterize the two percent limitation as a "performance limitation" similar to the claim terms at issue in those cases is unpersuasive and overbroad. Respectively, *Pall* and *Tekmar* dealt with the claim terms "skinless" and "passage." Beyond the readily apparent difference between these potentially broad terms and the precise specification of a two percent limit in the '511 patent, characterizing a claim limitation as a "performance characteristic" is not helpful as to whether the "necessarily present" requirement of inherency is met.

FN4. As indicated by this Court's questions at oral argument concerning the seemingly direct route to prove that the Gillery patent contains the two percent limitation--implementing an embodiment of the Gillery patent and testing it--this Court finds puzzling Crown's reluctance regarding this approach to generate extrinsic proof that the Gillery patent inherently meets the two percent limitation.

FN5. Also springing from these same underlying factual predicates is the § 112, second paragraph, definiteness requirement. This requirement is distinct from the enablement and description requirements, which arise from § 112, first paragraph.

[D]efiniteness and enablement are analytically

distinct requirements, even though both concepts are contained in 35 U.S.C. § 112. The definiteness requirement of 35 U.S.C. § 112, ¶ 2 is a legal requirement, based on the court's role as construer of patent claims . . . Definiteness requires the language of the claim to set forth clearly the domain over which the applicant seeks exclusive rights. . . . The test for whether a claim meets the definiteness requirement is "whether one skilled in the art would understand the bounds of the claim when read in light of the specification."

Process Control Corp., 190 F.3d at 1358 n.2, 52 USPQ2d at 1034 n.2 (internal citations omitted). *See also* 3 Donald S. Chisum, *Chisum on Patents*, § 8.03 at 8-14(2001) (noting the difference between the requirements of "definiteness, which claims must meet, from the requirements of enablement, which the disclosures of the specification must meet").

FN6. Based on the record before us, the written description issue has the following procedural posture: (i) Crown's Count VI of its amended complaint raised the written description issue; (ii) Solutia's summary judgment motion argued that the '258 patent met the written description requirement; (iii) in opposition Crown argued that the written description requirement was not met; (iv) the district court did not dispose of the written description issue or discuss the issue in its opinion in a way that enables our review; and (v) Crown preserved the written description issue in its appeal to this court and thus has not waived its further adjudication on remand.

FN7. All seventeen claims of the '258 patent refer to wave index, thus they all stand or fall together.

FN8. The court in *In re Cook* further notes that a claim may be invalid if it reads on significant numbers of inoperative embodiments. *In re Cook*, 439 F.2d at 734, 169 USPQ at 301-02 (citing *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 336 U.S. 271, 276-77, 80 USPQ 451, 453 (1949)). *See also In re Moore*, 439 F.2d 1232, 1236 169 USPQ 236, 239 (CCPA 1971) (noting that the question is whether the scope of enablement conveyed by the disclosure to a person of ordinary skill in the art is commensurate

with the scope of protection taught by the claims); *Chisum*, § 7.03[7][a] at 7-108 & n.6.

FN9. The inoperative embodiment inquiry informs the enablement inquiry; they are not the same inquiry. *Nat'l Recovery Techs.*, 166 F.3d at 1196, 49 USPQ2d at 1676.

FN10. We note that the specification for the '258 patent states that in the disclosed embodiment the wave index is calculated using a software program running on a personal computer being fed the trace line. '258 patent, col. 7, ll. 64-68. Undoubtedly, Solutia took care to ensure that the program contained the necessary boundary conditions and other information to calculate wave index to practice the invention. It appears, however, that Solutia took substantially less care in transcribing the information from the program into the specification's rules for calculating wave index. This incongruity will be relevant to the question of enablement upon remand. *See Chisum*, § 7.03[4][e] at 7-86 & n.77 ("A specification that claims an invention requiring implementation through computer software but fails to set forth the details of computer programming may present issues of whether the experimentation required to write the programming is reasonable or unreasonable.") (summarizing the teachings of various cases).

FN11. The *Wands* factors are:

(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

FN11. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

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Appendix 6: *Ex parte Herbermann*, 1997 WL 1935418 (Bd. Pat. App. & Interf. 1997)

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*1 THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

Board of Patent Appeals and Interferences

Patent and Trademark Office (P.T.O.)

EX PARTE ALFRED F. HERBERMANN

Appeal No. 97-2999

Application No. 08/338,714 [FN1]

NO DATE REFERENCE AVAILABLE FOR THIS DOCUMENT

THEODORE W OLDS
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Before STAAB, McQUADE, and NASE
Administrative Patent Judges

NASE
Administrative Patent Judge

ON BRIEF

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 23 through 25, 33 and 35 through 40 [FN2] Claims 26 through 32 are allowed. Claims 1 through 22 and 34 have been canceled.

We AFFIRM-IN-PART.

BACKGROUND

The appellant's invention relates to ball jointed links. An understanding of the invention can be derived from a reading of exemplary claims 23, 33 and 36, which appear in the appendix to the appellant's brief.

The prior art references of record relied upon by the examiner as evidence of obviousness under 35 U.S.C. § 103 are:

Haver	2,329,369	Sep. 14, 1943
Kujawski	2,439,009	Apr. 6, 1948
Wagenknecht	4,941,481	July 17, 1990

Claims 33 and 35 through 40 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and

(Cite as: 1997 WL 1935418, *1 (Bd.Pat.App & Interf.))

distinctly claim the subject matter which the appellant regards as the invention. Claims 23 through 25 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kujawski in view of Haver.

Claims 33 and 35 through 40 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kujawski in view of Wagenknecht.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the § 103 and § 112 rejections, we make reference to the examiner's answer (Paper No. 22, mailed March 17, 1997) for the examiner's complete reasoning in support of the rejections, and to the appellant's brief (Paper No. 21, filed December 23, 1996) and reply brief (Paper No. 23, filed May 5, 1997) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner. As a consequence of our review, we make the determinations which follow.

The indefiniteness issues

We do not sustain the rejections of claims 33 and 35 through 40 under 35 U.S.C. § 112, second paragraph.

The second paragraph of 35 U.S.C. § 112 requires claims to set out and circumscribe a particular area with a reasonable degree of precision and particularity. In re Johnson, 558 F.2d 1008, 1015, 194 USPQ 187, 193 (CCPA 1977). In making this determination, the definiteness of the language employed in the claims must be analyzed, not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. Id.

Claims 33 and 35

***2** We do not agree with the examiner that claim 33 infers that the male ball is formed of a material "harder" than the clamp. Claim 33 recites that the male ball is formed of a material that is "harder" than the female locking portion. The specification makes clear that the female locking portion includes both the socket 30 and the clamp 28. The specification also clearly describes that the male ball 32 is formed of a material that is "harder" than the socket 30. In our opinion, claim 33, when read in light of the specification, is definite since the scope of the invention sought to be patented can be determined from the language of the claim with a reasonable degree of certainty. Furthermore, while the examiner is correct that the language of claim 33 is broad enough to read on the male ball being formed of a material "harder" than the clamp, the mere breadth of the claim does not in and of itself make the claim indefinite.

Claims 36 through 40

(Cite as: 1997 WL 1935418, *2 (Bd.Pat.App & Interf.))

We do not agree with the examiner that claim 36 is indefinite. When considering claim 36 as a whole, it is clear to us that claim 36 is reciting the combination of a base, a mount structure, a tool and at least two links. We reach this conclusion based upon claim 36 reciting (1) "A structure ... comprising: a mount structure mounted to a base; a tool mounted at a location remote from said base," and (2) that the at least two links connect "said tool to said base." While we agree with the examiner, that the preamble of claim 36 is inconsistent with the recitations of the body of the claim, such inconsistency, in this case, does not render the claim indefinite since the scope of the invention sought to be patented can be determined from the language of the claim with a reasonable degree of certainty. [FN3]

The obviousness issues

Claims 23 through 25

We sustain the rejection of claims 23 through 25 under 35 U.S.C. § 103.

Claim 23 recites a link element comprising, inter alia, a male ball, a female socket, and a body extension extending between the male ball and the female socket. The male ball is locked on the body extension by the male ball having a recess which receives a bead provided on the body extension.

Kujawski discloses a flexible joint of the ball and socket type. As shown in Figures 1 and 2, Kujawski's flexible joint includes a conduit 10 having two ends, a socket housing 22 is connected to one end of the conduit 10 and a ball 20 is connected to the other end of the conduit 10. As shown in Figure 2, the conduit 10 appears to be threadably connected to the ball 20.

Haver discloses a ball and socket joint. As shown in Figure 1, the joint includes a spherical cuff (i.e., ball) 8, a tubular outlet 5, and a socket 10. An annular ridge 6 is formed in the tubular outlet 5 to engage with an annular slot 7 formed in the inner wall of the cuff 8 and serves to secure the cuff 8 firmly in position upon the end of the tubular outlet 5.

*3 After the scope and content of the prior art are determined, the differences between the prior art and the claims at issue are to be ascertained. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966).

Based on our analysis and review of Kujawski and claim 23, we agree with the examiner that the only difference is that Kujawski utilizes a thread to secure conduit 10 (i.e., the body extension) to the ball 20 whereas claim 23 requires a bead on the body extension cooperating with a recess in the male ball to lock the male ball on the body extension.

With regard to this difference, the examiner determined (answer, p. 6) that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the link assembly of Kujawski by substituting the mating thread locking arrangement with the deformed bead and corresponding groove locking arrangement to benefit from having the locking arrangement which is much more simple and cost effective to make. We agree.

We do not agree with the appellant's argument (brief, pp. 9-10) that there is no suggestion in Haver that would have led one to modify Kujawski. When it is necessary to select elements of various teachings in order to form the claimed

(Cite as: 1997 WL 1935418, *3 (Bd.Pat.App & Interf.))

invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the appellant. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. The extent to which such suggestion must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case, in light of the prior art and its relationship to the appellant's invention. Thus, the references themselves must provide some teaching whereby the appellant's combination would have been obvious. In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991) (citations omitted). That is, something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. See In re Beattie, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992); Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984). In this case, it is our opinion that the teaching of Haver that ridge 6 is shaped to engage slot 7 to firmly secure the cuff 8 in position on the outlet 5 provides the needed suggestion to modify Kujawski as set forth by the examiner. Additionally, the self-evident advantages (e.g., a locking arrangement which is much more simple and cost effective to make) of substituting one known locking arrangement (i.e., bead and groove) for another known locking arrangement (i.e., threads) would have been readily apparent to a person of ordinary skill in the art. [FN4]

For the reasons set forth above, we sustain the examiner's rejection of claim 23 under 35 U.S.C. § 103.

*4 The appellant has grouped claims 23 through 25 as standing or falling together. [FN5] Thereby, in accordance with 37 CFR § 1.192(c)(7), claims 24 and 25 fall with claim 23. Thus, it follows that the examiner's rejection of claim 24 and 25 under 35 U.S.C. § 103 is also sustained.

Claims 33 and 35 through 40

We do not sustain the rejection of claims 33 and 35 through 40 under 35 U.S.C. § 103.

Independent claims 33 recites "a clamp tightened to have surfaces moving radially inwardly to lock said female locking portion on said male ball." Independent claims 36 recites "a clamp tightened to have surfaces moving radially inwardly to lock said female locking structure on said male ball."

With respect to the above-noted limitations, the examiner concluded (answer, p. 10) that due to the geometry of Kujawski's spherical ball 20, "the surface 30 would inherently move radially inward as the clamp 27 is screwed onto the threaded element 25."

The appellant (reply brief, pp. 2-3) does not agree with the examiner's "inherent" interpretation of movement. The appellant believes that as Kujawski's clamp 27 is screwed onto the threaded element 25, the surface 30 would be moved radially outwardly as the flange 29 moves onto larger diameter portions of the ball 20.

When relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. See Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Patent App. &

(Cite as: 1997 WL 1935418, *4 (Bd.Pat.App & Int rf.))

Int. 1990). The mere fact that a certain thing may result from a given set of circumstances is not sufficient. See *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981). We are mindful that there is a line of cases represented by *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971) which indicates that where an examiner has reason to believe that a functional limitation asserted to be critical in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on. Nevertheless, before an applicant can be put to this burdensome task, the examiner must provide sufficient evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art. In the case before us, it is our opinion that the examiner has not provided sufficient evidence or scientific reasoning to establish the reasonableness of his belief that the functional limitation is an inherent characteristic of Kujawski.

We have also reviewed the Haver and Wagenknecht references additionally relied upon by the examiner in rejecting the claims under appeal but find nothing therein that would have suggested the above-noted deficiency of Kujawski.

*5 Since all the limitations of independent claims 33 and 36 are not suggested or taught by the applied prior art, we cannot sustain the examiner's rejection of appealed claims 33 and 36, or claims 35 and 37 through 40 which depend therefrom, under 35 U.S.C. § 103.

CONCLUSION

To summarize, the decision of the examiner to reject claims 33 and 35 through 40 under 35 U.S.C. § 112, second paragraph is reversed; the decision of the examiner to reject claims 23 through 25 under 35 U.S.C. § 103 is affirmed; and the decision of the examiner to reject claims 33 and 35 through 40 under 35 U.S.C. § 103 is reversed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

BOARD OF PATENT APPEALS AND INTERFERENCES

LAWRENCE J. STAAB
Administrative Patent Judge
JOHN P. McQUADE
Administrative Patent Judge
JEFFREY V. NASE
Administrative Patent Judge

FN1. Application for patent filed November 14, 1994. According to the appellant, the application is a continuation of Application No. 08/177,091, filed January 3, 1994, now U.S. Patent No. 5,383,738, which was a continuation of Application No. 07/840,420, filed February 24, 1992, now abandoned.

(Cite as: 1997 WL 1935418, *5 (Bd.Pat.App & Interf.))

FN2. Claims 23, 33 and 35 have been amended subsequent to the final rejection.

FN3. We encourage the appellant to correct this inconsistency by filing a suitable amendment, such as the deletion of "for supporting a tool" from line 1 of claim 36.

FN4. An artisan must be presumed to know something about the art apart from what the references disclose (see *In re Jacoby*, 309 F.2d 513, 516, 135 USPQ 317, 319 (CCPA 1962)) and the conclusion of obviousness may be made from "common knowledge and common sense" of the person of ordinary skill in the art (see *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)).

FN5. See page 4 of the appellant's brief.

APPEAL NO. 97-2999 - JUDGE NASE

APPLICATION NO. 08/338,714

APJ NASE

APJ STAAB

APJ McQUADE

DECISION: AFFIRMED-IN-PART

Prepared By: Delores A. Lowe

DRAFT TYPED: 11 Mar 98

FINAL TYPED:

1997 WL 1935418 (Bd.Pat.App & Interf.)

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Appendix 7: *In re Oelrich*, 666 F.2d 578, 212 U.S.P.Q. 323 (C.C.P.A. 1981)

▷

In re Oelrich and Divigard
Court of Customs and Patent Appeals

No. 81-564

Decided Dec. 10, 1981

United States Patents Quarterly Headnotes

PATENTS

[1] Court of Customs and Patent Appeals -- Issues determined -- Ex parte patent cases (§ 28.203)
Prior adjudication -- Applications for patent (§ 56.05)

Doctrine of res judicata argued in view of former case in which issue was obviousness is not applicable to instant anticipation rejection; furthermore, res judicata does not have its usual impact when considering ex parte patent appeals; public interest in granting valid patents outweighs public interest underlying collateral estoppel and res judicata, particularly where issue presented is not substantially identical to that previously decided.

PATENTS

[2] Patentability -- New use or function -- In general (§ 51.551)

Mere recitation of newly discovered function or property, inherently possessed by things in prior art, does not distinguish claim drawn to those things from prior art.

PATENTS

[3] Construction of specification and claims -- "Means" claims (§ 22.60)
Pleading and practice in Patent Office -- Rejections (§ 54.7)

Rejection of claim whose distinguishing feature is words after means for function phrase is reversed where those words constitute limiting definition of means that is not expressly disclosed in reference nor inherent in it.

PATENTS

Particular patents -- Control Mechanism

Oelrich and Divigard, Sub-Critical Time Modulated Control Mechanism, rejection of claim 1 reversed.

***324** Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of John A. Oelrich and Albert

J. Divigard, Serial No. 452,050, filed Mar. 18, 1974. From decision rejecting claim 1, applicants appeal. Reversed.

See also 198 USPQ 210.

Roger A. Van Kirk, East Hartford, Conn., for appellants.

Joseph F. Nakamura and Thomas E. Lynch for Patent and Trademark Office.

Before Markey, Chief Judge, and Rich, Baldwin, Miller, and Nies, Associate Judges.

Rich, Judge.

This appeal is from the decision of the United States Patent and Trademark Office (PTO) Board of Appeals (board) sustaining the examiner's rejection of claim 1 in application serial No. 452,050, filed March 18, 1974, entitled "Sub- Critical Time Modulated Control Mechanism," under 35 USC 102 as anticipated by appellant Oelrich's U.S. patent No. 3,430,536 for "Time Modulated Pneumatically Actuated Control Mechanism," issued March 4, 1969. We reverse.

Background

This application was the subject of In re Oelrich, 579 F.2d 86, 198 USPQ 210 (CCPA 1978), in which a rejection of claims 1-5 under 35 USC 103 was reversed. Appellant's method claims 2-5 now stand allowed.

The invention of claim 1 is directed to an apparatus specially adapted for moving low inertia steering fins on guided missiles. The prior art apparatus and the theory upon which it operates are fully discussed in our above prior opinion and will, therefore, not be repeated here. Generally, the claimed device responds to an electric signal from a missile guidance system, the magnitude of which is proportional to the desired amount of course-correcting fin movement, and converts the signal into a pneumatic pressure of appropriate magnitude which acts on a piston to move the missile guiding fin. The device which is the subject of the Oelrich patent "was employed only with the then available steering fins which they characterize as 'high inertia' loads." [FN1] The frequency at which this "high inertia" load system is operated is stated to be above the critical (resonant) frequency of the system. 579 F.2d at 87-89, 198 USPQ at 212-13. The allowed

method claims and apparatus claim 1 direct use of a carrier frequency *below* the critical frequency of the system.

Claim 1 reads (emphasis ours):

1. A time modulated fluid actuated control apparatus comprising:

housing means, said housing means defining a cylinder;

actuator piston means disposed in said housing means cylinder, said piston means including an output member adapted to be connected to a movable load, said load and control apparatus *325 defining a *system having a range of resonant frequencies*;

solenoid operated valve means mounted on said housing means, said valve means being selectively operable to deliver pressurized fluid to and to vent fluid from said housing means cylinder at one side of said piston means;

means for generating variable input command signals commensurate with the desired position of the load, said command signals being characterized by a dynamic frequency range *below said range of said resonant frequencies*;

means for generating a signal at a *carrier frequency*, said carrier frequency being *greater than the maximum dynamic command signal frequency and less than the minimum system resonant frequency*;

means for modulating said carrier frequency signal by said command signals; and

means responsive to said modulated carrier frequency signal for controlling energization of said solenoid operated valve means.

In sustaining the examiner's rejection under §102, the board expressed agreement with his reasoning, which is here summarized. Stating that "the issue is identical to that decided in *In re Ludtke*, 58 CCPA 1159, 441 F.2d 660, 169 USPQ 563 (1971)," the examiner noted that, for purposes of determining inherency, "the question is, does Oelrich [the reference patent] disclose a signal generator that necessarily must supply the carrier frequencies that appellants use?" The examiner turned to Exhibit A of coapplicant Divigard's affidavit,

which states as an assumption in a "Linearized Simulation" of a "high inertia" load system that the critical resonance frequency must be kept below 80 Hz to avoid interaction with the carrier frequency which is between 100 and 150 Hz. Thus, the examiner concluded, "Exhibit A establishes Oelrich's carrier frequency range, which may now be compared with the carrier frequency range of applicants' low-inertia system." It was then asserted that the Oelrich and Kolk affidavits establish that good low inertia system design practice dictates a carrier frequency range of 95-190 Hz. Since the carrier frequency range for the high inertia system lies within the range for the low inertia system, and since the critical frequency of the low inertia system is near the solenoid limit of 175 Hz, the examiner posited that the Oelrich carrier frequencies would be sub-critical in the low inertia system, saying, "Thus Oelrich's signal generator does in fact inherently produce frequencies which would be sub-critical when used with a low-inertia system, and therefore, inherently supplies a carrier frequency range which is usable in applicants' system since this conclusion was deduced from specific data presented in the patent and in the affidavits supplied by appellants." The appellants also asserted our prior decision was res judicata.

Opinion

[1] Although appellants' arguments on appeal are directed primarily to a discussion of res judicata [FN2] and whether a "product which is unwittingly produced is anticipation," resolution of this case is properly had by comparison of the reference patent to the limitations of claim 1. As will appear, the determinative issue is a question of inherency.

The distinguishing feature of claim 1 is defined in the paragraph which states that the apparatus contains a

means for generating a * * * carrier frequency * * * greater than the maximum dynamic command signal frequency and *less than* the minimum system resonant frequency. [FN3]

Given that the carrier frequency which can be used in a low inertia system *may* fall within the range of carrier frequencies usable in a high inertia system (appellants admit as much), the PTO urges that the apparatus of the Oelrich patent inherently performs the function of the apparatus of claim 1, and that finding a new use for an old device does not entitle one to an apparatus claim for that device, citing *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979). Appellants in that case argued, however, that a structure suggested by the

***326** prior art was patentable to them because it also possessed an *inherent but unknown* function which they claimed to have discovered. This court stated that a "patent on such a structure would remove from the public that which is in the public domain by virtue of its inclusion in, or obviousness from, the prior art." *Id.* at 1023, 201 USPQ at 661.

Appellants here countered the PTO inherency contention at oral argument (no reply brief was filed) by urging that there is no "inherency" because there is no "inevitability," that is, the previously quoted "means plus function" limitation of claim 1 is not inherently (always) present in the device of the Oelrich patent.

[2] It is true that mere recitation of a newly discovered function or property, inherently possessed by things in the prior art, does not distinguish a claim drawn to those things from the prior art. In *re Swinehart*, 58 CCPA 1027, 1031, 439 F.2d 210, 212-13, 169 USPQ 226, 229 (1971). In this case, however, claim 1 does not merely recite a newly discovered function of an old device. In *re Chandler*, 45 CCPA 911, 254 F.2d 396, 117 USPQ 361 (1958), a case not cited by either party to this appeal, is most pertinent to the instant controversy.

The claim in *Chandler*, *id.* at 912-13, 254 F.2d at 397, 117 USPQ at 361-62, drawn to an automatic control for a jet engine, included a "means responsive to said movement for regulating the propulsive power of said engine, in accordance with said movement, *so that* said aircraft is propelled at a definite, selected speed, corresponding to the position of said engine relative to said aircraft, throughout the speed range of said aircraft." (Emphasis added.) In refuting the examiner's argument that the words beginning with "so that" were merely functional, and thus did not distinguish the device from that claimed in a patent to Goddard, this court stated:

* * * the expression beginning with "so that" is not merely functional, but constitutes a part of the definition of the "means responsive to said movement." Thus that means is defined as being responsive to the movement of the engine in such a way that the aircraft will be propelled at a definite speed in the manner specified. Such a definition conforms to the provision of 35 U.S.C. 112 that an element in a claim for a combination "may be expressed as a means or step for performing a specified function without the recital of structure, material or acts in support thereof. [FN4]

[3] Likewise, the words after "means for generating a * * * carrier frequency" in the claim on appeal constitute a limiting definition of the means. The PTO does not contend that this limitation, a carrier frequency which is "less than the minimum system resonant frequency," is expressly disclosed in the Oelrich patent. Neither, however, is this limitation inherent therein. In *Hansgirk v. Kemmer*, 26 CCPA 937, 940, 102 F.2d 212, 214, 40 USPQ 665, 667 (1939), the court said:

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient. [Citations omitted.] If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure should be regarded as sufficient.

The relationship between the carrier frequency and the system critical frequency -- the former below the latter (and expressly made a claim limitation by use of "means plus function" language) -- cannot be said to be "the natural result flowing from the operation as taught." The Oelrich patent instructs that the device is "adapted to receive a carrier frequency substantially in excess of the particular system critical or resonant frequency* * *." Given this express teaching, a "means for generating a * * * carrier frequency* * * less than the minimum system resonant frequency" is not inevitably present.

The decision of the board is *reversed*.

Reversed.

FN1 While the solicitor equates "low-inertia" with a "relatively light load" and "high-inertia" with a "relatively heavy load," appellants are not as unequivocal. They refer to "small inertia" and "low inertia" loads, but, for example, the Divigard affidavit refers to "Fin Inertia" in terms of "in-lb sec super2 / rad," a unit of measure applicable only in referencing *moment of inertia*, not *inertia*. The difference is significant because inertia, measured in terms of *mass*, is closely related to *weight*, while moment of inertia is affected by the *distribution* of the mass. Because of this ambiguity, we cannot and do not use the terms "weight" and "inertia" interchangeably.

FN2 The doctrine of *res judicata*, argued in view of our decision in *In re Oelrich*, 579 F.2d 86, 198 USPQ 210 (CCPA 1978), is not applicable to the instant

(Cite as: 212 U.S.P.Q. 323, *326)

rejection. The issue in the former case was obviousness; here it is anticipation. A new rejection is before us. Furthermore, res judicata does not have its usual impact when considering ex parte patent appeals; the public interest in granting valid patents outweighs the public interest underlying collateral estoppel and res judicata, particularly where the issue presented is not substantially identical to that previously decided. In re Russell, 58 CCPA 1081, 1083, 439 F.2d 1228, 1230, 169 USPQ 426, 428 (1971); In re Craig, 56 CCPA 1438, 1441-42, 411 F.2d 1333, 1335-36, 162 USPQ 157, 159 (1969).

FN3 Emphasis is ours. Portions of the claim unnecessary to this discussion have been omitted for

clarity.

FN4 For a similar case, see In re Wilson, 53 CCPA 1141, 1148-49, 359 F.2d 456, 461, 149 USPQ 523, 527 (1966). The provision of §112 referred to is, of course, the sixth paragraph, formerly, at the times of Chandler and Wilson, the third paragraph. The change occurred January 24, 1978.

Cust. & Pat.App.

212 U.S.P.Q. 323

END OF DOCUMENT

Appendix 8: *United States Surgical Corp. v. Ethicon Inc.*, 103 F.3d 1554, 41 U.S.P.Q.2d 1225
(Fed. Cir. 1997), *cert. denied*, 522 U.S. 950 (1997)

United States Surgical Corp.

v.

Ethicon Inc.

U.S. Court of Appeals Federal Circuit

Nos. 94-1386, -1419

Decided January 3, 1997

United States Patents Quarterly Headnotes

PATENTS

[1] Patentability/Validity -- Obviousness -- In general
(Section 115.0901)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Jury trials (Section 410.42)

Federal district court properly instructed jury on issue of obviousness in patent infringement action, since jury was correctly instructed on presumption of validity and that defendant bore burden of proving invalidity by clear and convincing evidence, and that it was necessary to consider scope and content of prior art, differences between prior art and claimed invention, level of ordinary skill in art, and objective criteria of non-obviousness, since instructions included explanation of principles to be applied in determining obviousness when invention is combination of prior art components, and since instructions were correct in law, thorough, and clearly stated.

PATENTS

[2] Patentability/Validity -- Obviousness -- In general
(Section 115.0901)

Patent construction -- Claims -- In general (Section 125.1301)

Federal district court need not repeat or restate every claim term in order to comply with rule that claim construction is for court rather than jury, since claim construction is matter of resolution of disputed meanings and technical scope, to clarify and if necessary explain what patentee covered by claims, for use in determination of infringement, rather than obligatory exercise in redundancy; although claim construction may occasionally be necessary in obviousness determinations, when meaning or scope of technical terms and words of art is unclear and requires resolution in order to determine obviousness, in present case none of rejected jury instructions concerning claim construction was directed to, or has been reasonably shown to affect, determination of

obviousness.

PATENTS

[3] Patentability/Validity -- Obviousness -- In general
(Section 115.0901)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Jury trials (Section 410.42)

Federal district court did not commit prejudicial error by providing dictionary to jury during its deliberations in patent infringement trial in which asserted claims were held invalid for obviousness, since district court explained in post trial opinion that jury instruction to consider ordinary meaning of claim language, and general assumption that definitions of dictionary are common knowledge with which jury is charged, support provision of dictionary, since provision of dictionary to jury, although not favored, is not grounds for new trial, and since plaintiff has offered no specifics as to words whose dictionary definitions may have adversely affected verdict of obviousness, and no suggestion that jury disregarded court's instructions on law of obviousness or plain meaning of terms used in claims and prior art.

PATENTS

[4] Patentability/Validity -- Obviousness -- In general
(Section 115.0901)

Patent construction -- Claims -- In general (Section 125.1301)

JUDICIAL PRACTICE AND PROCEDURE

Procedure -- Jury trials (Section 410.42)

Federal district court's rejection of proposed jury instructions directed to construction of patent claims did not prejudice jury's determination of obviousness, since district court is not required to parse claims for jury in every case, whether or not there is issue in material dispute as to meaning or scope of claims, since infringement plaintiff has not shown that there are unclear or ambiguous technical terms or words of art or related aspects of claim scope whose "construction" would negate verdict of obviousness, and has not explained how any reasonable claim construction it requested would have deprived obviousness verdict of its support, and since trial court is not authorized to remove from jury factual findings underlying obviousness determination.

JUDICIAL PRACTICE AND PROCEDURE

Particular patents -- General and mechanical --
Surgical clip application

5,084,057, Green, Bolanos, Young, McGarry, Heaton, and Ratcliff, apparatus and method for applying surgical clips in laparoscopic or endoscopic procedures, judgment that claims 1, 2 and 7 are invalid for obviousness affirmed.

5,100,420, Green, Bolanos, Young, McGarry, Heaton, and Ratcliff, apparatus and method for applying surgical clips in laparoscopic or endoscopic procedures, judgment that claim 1 is invalid for obviousness affirmed.

***1226** On remand from the U.S. Supreme Court.

Action by United States Surgical Corp. against Ethicon Inc. and Johnson & Johnson Hospital Services Inc. for patent infringement. The U.S. District Court for the District of Connecticut entered judgment for defendants on jury verdicts that plaintiff's patent no. 5,100,420 is infringed but invalid for obviousness, and that plaintiff's patent no. 5,084,057 is not infringed and invalid for obviousness. On appeal, the U.S. Court of Appeals for the Federal Circuit affirmed without opinion pursuant to Fed.Cir.R. 36. Following grant of certiorari, the U.S. Supreme Court vacated that affirmance and remanded for further consideration in light of its decision in *Markman v. Westview Instruments Inc.* (38 USPQ2d 1461). On remand, district court's judgment is affirmed on ground of invalidity of patents in suit based on obviousness.

William E. McDaniels, J. Alan Galbraith, and David S. Blatt, of Williams & Connolly, Washington, D.C.; Basam E. Nabulsi, Thomas R. Bremer, and John C. Andres, Norwalk, Conn., for plaintiff-appellant.

David F. Dobbins, Gregory L. Diskant, and Eugene M. Gelernter, of Patterson, Belknap, Webb & Tyler, New York, N.Y., for defendants/cross-appellants.

Before Newman, circuit judge, Bennett, senior circuit judge, and Rader, circuit judge.

Newman, J.

The court's prior judgment of this appeal and cross-appeal was vacated by the Supreme Court and remanded "for further consideration in light of *Markman v. Westview Instruments, Inc.*, 517 U.S. ____ (1996)." *U.S. Surgical Corp. v. Ethicon, Inc.*, 116 S. Ct. 1562 (1996). Our prior judgment affirmed the judgment of the United States District Court for the District of Connecticut, [FN1] entered on jury verdicts that claim 1 of U.S. Surgical's United States Patent No. 5,100,420 (the '420 patent) is infringed but invalid for

obviousness, and that claims 1, 2, and 7 of United States Patent No. 5,084,057 (the '057 patent) are not infringed and are invalid for obviousness. The issue of inequitable conduct during patent prosecution was decided before trial, by summary judgment in favor of U.S. Surgical. Each of U.S. Surgical and Ethicon appealed the rulings adverse to it. After full briefing and oral argument this court entered judgment pursuant to Federal Circuit Rule 36:

Rule 36: Judgment of affirmance without opinion.--

The court may enter a judgment of affirmance without opinion, citing this rule, when it determines that any of the following circumstances exist:

(a) the judgment, decision or order of the trial court appealed from is based on findings that are not clearly erroneous;

(b) the evidence in support of a jury verdict is sufficient;

(c) summary judgment, directed verdict, or judgment on the pleadings is supported by the record;

(d) the decision of an administrative agency warrants affirmance under the standard of review in the statute authorizing the petition for review; or

(e) a judgment or decision has been entered without an error of law;

and an opinion would have no precedential value.

Appeals whose judgments are entered under Rule 36 receive the full consideration of the court, and are no less carefully decided than the cases in which we issue full opinions. The Rule permits the court to dispense with issuing an opinion that would have no precedential value, when the circumstances of the Rule exist. *See Taylor v. McKeithen*, 407 U.S. 191, 194 n.4 (1972) ("We, of course, agree that the courts of appeals should have wide latitude in their decisions of whether or how to write opinions. That is especially true with respect to summary affirmances.")

Seven weeks after this decision, reported at 48 F.3d 1237 (Fed. Cir. 1995) (Table), for which rehearing and rehearing *en banc* were denied, the Federal Circuit decided *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 34 USPQ2d 1321 (Fed. Cir. 1995) (*en banc*). The Supreme Court granted certiorari in *Markman* and also upon U.S. Surgical's petition. After deciding

the *Markman* appeal, reported at 517 U.S. , 116 S. Ct. 1384, 38 USPQ2d 1461 (1996), the Court instructed the Federal Circuit to give further consideration to U.S. Surgical's case in light of the *1227 Court's decision in *Markman*. We have done so.

The judgment of the district court is affirmed, on the ground of invalidity of the '420 and '057 patents based on obviousness. We do not reach the issues of infringement and the conditional cross-appeal of the issue of inequitable conduct. See *Consolidated Aluminum Corp. v. Foseco Int'l Ltd.*, 910 F.2d 804, 814, 15 USPQ2d 1481, 1489 (1990) ("a party may defend a judgment 'on any ground properly raised below' ") (citing *Washington v. Yakima Indian Nation*, 439 U.S. 463, 476 n.20 (1979)); *Lough v. Brunswick Corp.*, 86 F.3d 1113, 1123, 39 USPQ2d 1100, 1107 (Fed. Cir. 1996) ("No further public interest is served by our resolving an infringement question after a determination that the patent is invalid."). We now fully explain our decision.

The U.S. Surgical Inventions

The inventions claimed in the '420 patent and its continuation-in-part the '057 patent are for a surgical instrument for ligating blood vessels and other tissues during endoscopic surgery, by applying multiple ligating clips in sequence.

Endoscopic surgery is a procedure whereby instead of opening the abdomen or other body cavity by incision to provide open access to the surgical site, the surgery is performed by inserting the surgical instruments into the body through small tubes called trocars. The small size of the incisions that accommodate the trocars results in less tissue damage, less pain, and faster healing than for traditional open surgery. In performing endoscopic surgery the body cavity is inflated with a gas, called aninsufflating gas, to provide working space. For most procedures today a miniature video camera is used to televise the surgical site, the enlarged video image appearing upon an external screen and guiding the surgeon or surgical team in manipulating the instruments through the trocars.

Endoscopic surgery was in somewhat limited use for many years, having been used mostly for the ligation of fallopian tubes, the surgeon viewing the site through an eyepiece. Endoscopic procedures experienced rapid expansion after about 1989, particularly for gallbladder removal. Witnesses disputed at trial whether the expansion was due to the development of the miniature video camera or the development of U.S. Surgical's

endoscopic multiple clip applier.

During both endoscopic and open surgery, blood vessels may be closed and tissues clamped using small "U" shaped clamps called ligating clips. Ligating clips are applied by an instrument that positions the clip about the tissue or vessel to be secured and then compresses the clip. When initially developed, ligating clip instruments were capable of being loaded with only one clip at a time, and required reloading between each application. Then U.S. Surgical developed a ligating clip applier for open surgical use that applied multiple clips in succession, without reloading the instrument. This instrument, having the brand name "Premium Surgiclip," is the subject of United States Patent No. 5,030,226 (the '226 patent). The Premium Surgiclip and the '226 patent are prior art to the '420 and '057 patents in suit, and were the subject of extensive testimony at trial.

At trial witnesses explained the subsequent development of the instrument of the patents in suit, a ligating clip applier for endoscopic use that applies multiple clips in succession without withdrawing and reloading the instrument. U.S. Surgical's instrument, having the brand name EndoClip, was the first multiple clip applier for endoscopic use. The instrument is depicted in the '420 patent as follows:

Image 1 (2.25 X 4.25) Available for Offline Print

*1228 The instrument is depicted in the '057 patent with a different handle, as follows:

Image 2 (1.75 X 3.25) Available for Offline Print

It is seen that these instruments have an elongated shank that holds the ligating clips and is shaped for endoscopic use through a trocar. After insertion into the body cavity a clip is pushed into position in the jaws using controls on the handle, and the clip is applied to the tissue to be ligated by closing the jaws using controls on the handle. The jaws are then opened and the next clip is pushed into position. Thus successive clips may be applied without withdrawing the instrument from within the body.

Claim 1 of the '420 patent is directed to the combination of the trocar and the clip applier, each component having defined limitations. Claim 1 is the only '420 patent claim in suit:

1. In combination:

a) a trocar having a cannula, and valve means for sealing said cannula, said cannula being adapted for entry into a body cavity;

b) an endoscopic clip applier having:

i) a frame;

ii) an endoscopic portion defining a longitudinal axis and extending distally from said frame, said endoscopic portion being insertable into said cannula through said valve means in sealing engagement therewith, said endoscopic portion further including a plurality of surgical clips disposed in an array and clip closing means for sequentially closing said surgical clips; and

iii) seal means associated and adapted to cooperate with at least one of said endoscopic portion and said frame to obstruct passage of gaseous media from the body cavity.

Claim 1, the broadest claim of the '057 patent, also describes the endoscopic apparatus as comprising several elements. The claim elements are defined in terms of their function, as provided in 35 U.S.C. Section 112 Para.6:

1. An apparatus for endoscopic application of surgical clips to body tissue which comprises:

a) frame means;

b) endoscopic means connected to said frame means of generally elongated configuration and extending distally from said frame means and including:

i) means for storing a plurality of surgical clips;

ii) means for individually advancing said clips to the distal portion of said endoscopic means for positioning adjacent the body tissue to be clipped;

iii) means for at least partially closing said clip at least sufficient to grip the body tissue after the clip has been advanced distally to said distal portion of said endoscopic means; and

iv) gaseous sealing means.

Claim 2 of the '057 patent specifies the use of silicon grease as the gaseous sealing means of clause iv, and claim 7 is directed to a disposable device as in claim 1.

Ethicon's defense that the claims are invalid for obviousness was based on the ground that U.S. Surgical had merely adapted to endoscopic use its own, prior art multiple clip applier, the Premium Surgiclip of the '226 patent, by known and routine adaptation. Thus Ethicon presented evidence and argument that U.S. Surgical had simply elongated the body of its prior art multiple clip applier so that it could be used through a trocar, with a sealing means to prevent escape of the insufflating gas through the trocar. Ethicon adduced extensive evidence that such adaptation was well known to persons of ordinary skill in the field of endoscopic instruments. U.S. Surgical countered with evidence and argument to the contrary.

The jury held, by special verdicts, that the claims in suit were invalid for obviousness. On appellate review we determine whether, on correct instructions of law, there was substantial evidence whereby a reasonable jury could have reached the verdict reached by this jury. *See Litton Sys., Inc. v. Honeywell, Inc.*, 87 F.3d 1559, 1566, 39 USPQ2d *1229 1321, 1324 (Fed. Cir. 1996) ("Substantial evidence describes that minimum quantum of evidence from which a jury might reasonably afford relief."); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 72 F.3d 857, 862, 37 USPQ2d 1161, 1163 (Fed. Cir. 1995) ("Substantial evidence is such relevant evidence, on the record as a whole, as could be accepted by a reasonable mind as adequate to support the verdict.") Conflicting evidence and argument must be viewed as resolved favorably to the party in whose favor the jury found. The reviewing court must give appropriate deference to the jury's choices in weighing the evidence, in deciding between opposing positions, and in drawing factual inferences. *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989) ("the appellate court's function is exhausted when that evidentiary basis [of the jury's verdict] becomes apparent, it being immaterial that the court might draw a contrary inference or feel that another conclusion is more reasonable.") (quoting *Lavender v. Kurn*, 327 U.S. 645, 653 (1946)); *Medtronic, Inc. v. Intermedics, Inc.*, 799 F.2d 734, 742, 230 USPQ 641, 646 (Fed. Cir. 1986), *cert. denied*, 479 U.S. 1033 (1987).

The Prior Art

As we have remarked, Ethicon's position was that U.S. Surgical had simply elongated its prior art multiple ligating instrument so that it could be inserted through a trocar, and used known endoscopic sealing mechanisms to inhibit escape of the insufflating gas through the trocar. Expert witnesses testified that these

modifications were well known to persons of ordinary skill in the art of endoscopic instruments. The witnesses presented several prior art patents, and exhibited many actual instruments, all having the common endoscopic characteristics of an elongated body and sealable engagement with the trocar.

The district court mentioned, in the opinion accompanying the denial of post-trial motions, that U.S. Surgical's technical expert testified that there were approximately forty different prior art multiple clip applicators for conventional open surgery. He testified that at least four of them -- the Premium Surgiclip of the '226 patent and the multiple clip applicators shown in the Montgomery patent, the Peters patent, and the Lachakar patent -- embodied all of the elements of the '420/ '057 claims except for the elongated body and sealing means. He testified that an elongated body and sealing means are characteristics of all endoscopic surgical instruments. In evidence were a variety of actual instruments for endoscopic surgery, all having these characteristics. These endoscopic instruments included graspers, scissors, dissectors, and single clip applicators. All had an elongated body and were adapted for sealing engagement with the trocar.

Also in evidence were references describing prior endoscopic devices for the application of multiple fasteners other than ligating clips. U.S. Patent No. 3,870,048 to Yoon showed an applier for multiple elastic rings for ligating fallopian tubes, stating that "[i]t is possible to load suture ring clips within the applicator in end-to-end series fashion. . . . This permits a number of clips to be applied during a procedure without the need of having to withdraw the applicator from the surgical field in order to load another clip into the applicator." U.S. Patent No. 4,226,239 to Polk also showed an instrument for endoscopic application of multiple ligating rings. The prior art also included at least one endoscopic multiple staple applier, Patent No. 4,944,443 to Oddsen. All of the endoscopic instruments for applying multiple fasteners had the common characteristics of elongation for use through a trocar, and most were sealed against escape of the gas through the trocar. Several references showed the use of silicon grease, as specified in claim 2 of the '057 patent, or valves, as specified in claim 1 of the '420 patent, to maintain the seal.

The testimony of U.S. Surgical's technical expert that the elongated body and the seal are common characteristics of endoscopic instruments was described by Ethicon as a concession of great weight. This evidence was stressed at trial, as Ethicon pressed

its argument that U.S. Surgical had simply adapted its '226 patent multiple clip applier for endoscopic use, and that it was obvious to do so, pointing to many other instruments that had been adapted in the same way. U.S. Surgical points out that this same expert and several other expert witnesses testified about the difficulties of designing the '420/ '057 endoscopic multiple clip applier and the time and cost involved. We take note of the conflicting testimony and the opposing expert opinions of witnesses for these parties, and of the lengthy explorations by these witnesses of this technology and the development and characteristics of these surgical instruments.

In comparing the '420/ '057 instruments with the prior art instruments, Ethicon's patent expert testified that the prior art '226 patent was the closest prior art and that the relevant elements of the structure of the '226 patent "were adopted into the subject matter of the '057 and '420 patent applications." *1230 Ethicon's technical expert pointed out to the jury all of the similarities of the structure and mechanisms between the device of the '226 patent and the '420/ '057 patents. He pointed to the jaws to hold the clip, the pusher for advancing a stored clip to the jaws, the grooves in the face of the jaws to receive the clip, and the mechanism for closing the clip about the tissue to be ligated. The drawings of the jaws in the '226 patent and in the '420/ '057 patents show this similarity:

Image 3 (1.75 X 3.5) Available for Offline Print

Witnesses testified that the operation of the '226 instrument and the '420/ '057 patents was essentially the same. It was explained that in both the '226 and the '420/ '057 instruments the jaw blade, clip carrier, and pusher bar are all enclosed in a channel assembly from which the jaws protrude at the end. In the '226 patent the applicator is described in the Abstract as:

The surgical clip applicator has a pusher bar which positions the foremost clip from a clip carrier into a ready-to-fire position between the jaws prior to squeezing of the handles together. When the applicator is fired, the previously positioned surgical clip can be crimped about a vessel and when the jaws are released, a new clip is placed between the jaws for the next firing. A channel assembly moves over the jaws to close the jaws while the pusher bar is retracted into the clip carrier for delivering the foremost clip from the carrier upon release of the handles.

Referring to Fig. 4 of the '226 patent, it was explained at trial that the pusher bar (35) moves a clip (33) into

the channels in the faces of the jaws (25). When a clip is in the jaws and the handles are closed, the external channel (38) moves forward over the beveled portion of the jaws, which, by virtue of their beveled shape, are squeezed together by the external channel, thus closing the clip. At the same time, the pusher bar moves back to engage the next clip in line. When the handle is released the channel withdraws, the jaws open and release the clipped tissue, and the pusher bar moves forward, positioning the next clip into the jaws. The operating components are shown in the patent as follows:

Image 4 (2.75 X 3.75) Available for Offline Print

***1231** In the '226 patent the clip carrier is described as "an elongated channel having a pair of side walls or rails between which the clips are slidably guided, a pusher which slides between the rails, and a spring for biasing the pusher in the forward direction." Col. 4, lines 45-54. The corresponding assembly, shown in Fig. 18 of the '420 patent, was the subject of comparative testimony:

Image 5 (2.5 X 4.25) Available for Offline Print

It was explained that the pusher bar (143) moves a ligating clip (138) into the channels in the faces of the jaws (135-b). When a clip is in the jaws and the handles are closed, the external channel (133) moves forward over the beveled portion of the jaws, squeezing them together and closing the clip.

To counter this evidence of similarity, U.S. Surgical witnesses testified that the '420/ '057 instrument was not a routine adaptation of a prior instrument, and stressed the long development time and engineering difficulties involved in the conversion of the '226 device to endoscopic use. Ethicon challenged these arguments and their factual basis on cross-examination, and elicited testimony that the development time related primarily to unclaimed features of the handle.

There was testimony about the seal and how it was achieved. In its infringement case U.S. Surgical argued that "valve means" in the '420 patent included any known means for sealing the clip applier in the trocar, including valves and gaskets. U.S. Surgical argued at trial as stated in its proposed jury instruction construing this term for infringement purposes:

The structure for performing this [valve means] function includes all such structures contained in trocars known in the art at the time the '420 Patent

Application was filed.

U.S. Surgical presented testimony to this effect at trial, thus providing substantial basis for the jury to find that the "valve means" of the '420 patent was known in the prior art. U.S. Surgical does not now dispute that the "valve means" of its '420 patent is found in prior art endoscopic instruments.

In the course of the extensive explanation and comparisons at trial of the prior art devices and the '420/ '057 devices, there was no dispute concerning the content of the references or the structures that they described. There was no dispute concerning the structures described in the '420/ '057 patents, or concerning the meaning of technical terms or words of art as used in the prior art or in the patents in suit. The jury was instructed that the technical terms had their plain meaning, as the district court mentioned in its opinion on the post-trial motions. U.S. Surgical did not proffer a particular "construction" of technical terms in order to distinguish the claimed inventions from prior art devices. Neither party departed from the plain meaning of the words that were used in the claims and in the specifications, and in the prior art. Although U.S. Surgical has raised on this appeal the issue of "claim construction," as we shall discuss *post*, there was no argument at trial as to the meaning of technical terms or words of art insofar as they concern the determination of obviousness.

There was opinion evidence on both sides of the question of obviousness. We turn to the objective factors, for as the district court instructed the jury, such evidence must be ***1232** considered in the determination of obviousness:

Objective Factors

Objective factors assist in understanding how the invention was viewed in its field of endeavor, and provide an important practical guide to the decisionmaker. It was explained to the jury that the context in which the invention arose and its reception in the marketplace are indicia of unobviousness, and must be considered.

Witnesses for U.S. Surgical testified that the EndoClip, a commercial embodiment of the '420/ '057 patents, had revolutionized endoscopic surgery and made endoscopic gall bladder removal possible. Its commercial success was emphasized, and it was stressed that the EndoClip was the first and for some years the only endoscopic multiple clip applier on the

market. U.S. Surgical pointed out that the most relevant prior art, viz. single clip applicators for endoscopic surgery and multiple clip applicators for open surgery, had existed for more than a decade before U.S. Surgical produced the EndoClip for endoscopic surgery. U.S. Surgical presented evidence of the rapid acceptance and adoption of new endoscopic procedures, based on its new multiple clip applicator.

Witnesses for Ethicon testified that the growth of endoscopic surgery was due to the miniature video camera, not the multiple clip applicator. They testified that before a tiny camera was available to televise images of the abdominal cavity, whereby a team of surgeons could operate with a common view of the surgical field, endoscopic surgery was largely limited to ligation of fallopian tubes, a simple procedure performed by a surgeon peering through an eyepiece. According to Ethicon, U.S. Surgical's EndoClip was developed for and had its only use for tubal ligation, and its later commercial growth was due to the sheer luck of being on the market when endoscopic surgery underwent its rapid expansion upon the capability of televising from inside the body.

Thus U.S. Surgical characterized its '420/ '057 multiple clip applicator as a pioneering advance in the field of endoscopic surgery, while Ethicon described the '420/ '057 instrument as an obvious adaptation of a prior art multiple clip applicator, whose commercial success was due to unrelated factors. These conflicting arguments were fully presented at trial. Witnesses, including surgeons, supported both sides. The jury was presented with questions of credibility and weight as well as factual disputes, as the jury decided whether the inventions of the claims in suit would have been obvious to a person of ordinary skill in the field of the invention at the time the invention was made. Although there were indeed questions of credibility and weight of evidence, the jury was not required to choose between alternative meanings of technical terms or words of art, or decide the scope of the claims, in deciding the question of obviousness. The factual findings of the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the field of the invention, and the objective considerations, did not require "construction" of these claims as set forth in the *Markman* decisions of the Federal Circuit and the Supreme Court.

In reviewing the jury verdict of obviousness, we review whether the jury was correctly instructed on the law, and whether there was substantial evidence

whereby a reasonable jury could have reached its verdict upon application of the correct law to the facts, *Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1512, 220 USPQ 929, 935-36 (Fed. Cir.), cert. denied, 469 U.S. 871 (1984), recognizing that invalidity must be proved by clear and convincing evidence. *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 USPQ 669, 673 (Fed. Cir. 1984). Thus we turn to the law, as presented at trial and as instructed by the trial judge.

The Jury Instructions

Jury instructions are reviewed for correctness, with due attention to their clarity, objectivity, and adequacy, taken as a whole. See *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1570, 24 USPQ2d 1401, 1411 (Fed. Cir. 1992) ("The correctness of a jury instruction . . . is reviewed on appeal to determine whether, on the whole, the jury instructions were adequate to ensure that the jury fully understood the legal issues for each element of the case."); *Trademark Research Corp. v. Maxwell Online, Inc.*, 995 F.2d 326, 339 (2d Cir. 1993) ("A trial court's improper charge constitutes reversible error only 'when jury instructions, taken as a whole, give the jury a misleading impression or inadequate understanding of the law.' ") (quoting *Carvel Corp. v. Diversified Management Group, Inc.*, 930 F.2d 228, 232 (2d Cir. 1991)).

[1] The jury was correctly instructed on the presumption of validity, and that Ethicon bore the burden of proving invalidity by clear and convincing evidence. The jury was correctly instructed that in determining whether the inventions of the '420 and '057 patents *1233 were invalid based on obviousness, it was necessary to consider the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the art, and the objective criteria of unobviousness. The court correctly explained the *Graham* factors. See *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). For example, in determining the level of ordinary skill in the art the jury was instructed to consider

evidence submitted by the parties to show:

One, the educational level of active workers in the field;

Two, the types of problems encountered in the art;

Three, the nature of the prior art solutions to those problems;

Four, the activities of others;

Five, the rapidity with which innovations are made in the art;

And six, the sophistication of the technology involved.

The jury instructions included explanation of the principles to be applied in determining obviousness when the invention is a combination of prior art components. The court instructed that the prior art must show not only all of the elements of the claimed combination, but must contain some "teaching, suggestion or incentive" to a person of ordinary skill to combine the known elements in the way that U.S. Surgical combined them:

In order to prove obviousness, the defendants must prove, again by clear and convincing evidence, that one of ordinary skill in the art would have found in the prior art references some teaching, suggestion or incentive to combine the prior art references in the way that U.S. Surgical did in its invention.

The jury instructions stressed that the prior art, to be invalidating, must sufficiently teach or direct a person of ordinary skill how to obtain the result reached by the patentee:

Additionally, if you do find a teaching in the prior art that would motivate one of ordinary skill in the prior art to make the clip applier claimed in the '057 and '420 patents, you must also determine whether there was sufficient teaching or direction in the prior art of how to obtain or build the claimed clip applier such that a person of ordinary skill in the art would have a reasonable likelihood of success in making the invention. In other words, in order to find obviousness, you must find not only that the prior art would teach one of ordinary skill to try the combination of known elements, but also that the prior art would sufficiently teach or direct one of ordinary skill how to obtain the desired result.

The jury was instructed that in determining obviousness it was to consider the claim as a whole, and that it did not suffice if the individual elements of the invention were known in the prior art:

The reason you must consider the claim as a whole is

because there is no dispute that U.S. Surgical's invention is comprised of individual elements which were known in the prior art. The fact that U.S. Surgical's inventions incorporate or combine elements already known in the prior art does not render its patents invalid. Patents can be granted on devices that contain a combination of various elements that are well known in the prior art. U.S. Surgical's claim is that it invented the combination of those elements for the first time in the endoscopic multiple clip applier claimed in the patents in suit.

The instructions on the law of obviousness occupied eight pages of trial transcript. They were correct in law, thorough, and clearly stated. U.S. Surgical now argues that other instructions that it requested should also have been given, and that their omission requires a new trial. The district court explained its denial of these requests in its opinion on the post-trial motions.

U.S. Surgical had requested that the court read to the jury the sentence of 35 U.S.C. Section 103(a) that states: "Patentability shall not be negated by the manner in which the invention was made," accompanied by the instruction that the jury should give no weight to Ethicon's evidence of "how long or short a time it took to make [the invention]" and "how obvious U.S. Surgical's invention may have seemed to U.S. Surgical's own inventors." The court denied the request. We do not discern reversible error in this denial, for the rejected instruction was encompassed in the instructions that were given, was the subject of expert testimony, and was included in the argument. The court did not commit error in denying an instruction that gave weight to one of the several aspects that were before the jury, and was reasonably viewed as cumulative in the context of the instructions that were given.

U.S. Surgical also requested an instruction that the '226 patent was cumulative prior art and thus did not have to be cited to the patent examiner. In its pre-trial consideration of the issue of inequitable conduct the court, through a special master, had concluded that the '226 patent was cumulative in the circumstances and on the law that then applied in the examination of patents. Whatever the relevance of this point to the issue of *1234 inequitable conduct, which had been decided in favor of U.S. Surgical, the '226 patent was correctly treated as prior art in this litigation. The denial of this instruction is not grounds for a new trial.

U.S. Surgical also requested the instruction that even if the jury found the absence of the secondary

consideration of long-felt need, that was "in no way suggestive of obviousness or invalidity." The instruction that was given on the secondary considerations was:

In making these three determinations [the *Graham* factors] you must also consider other surrounding circumstances which are called secondary considerations. These include:

One, whether the alleged invention was commercially successful;

Two, whether the alleged invention satisfied a long-felt need in the art;

Three, whether others were unsuccessful in making the alleged invention;

Four, whether the alleged invention was copied by others in the art;

Five, whether the alleged invention received praise from others in the art;

Six, whether the alleged invention departed from other principles of the art.

In order to determine that secondary considerations such as commercial success are evidence of non-obviousness, there must be a causal connection between the patented features of the invention and the commercial success of the device. If commercial success is attributable to the patented features, then it is evidence of non-obviousness.

U.S. Surgical's requested instruction concerning long-felt need related to the weight to be given to a fact whose existence, and significance, was disputed at trial. The issue of the objective factors was complex and hard-fought at trial, leaving areas of dispute, weight, and perhaps credibility. We discern no error in the court's refusal to comment on a specific aspect, having instructed the jury on all aspects.

U.S. Surgical also requested the instruction that prior art that teaches away from the patented invention is evidence of nonobviousness. That subject was comprehended in the above-quoted instruction that the jury should consider "Six, whether the alleged invention departed from other principles of the art," an argument whose substance had been debated at trial. The refusal of this instruction, in light of the full instructions that were given, is not grounds for a new

trial.

U.S. Surgical also states that the district court should have given a curative instruction to counter Ethicon's suggestion that the patents in suit improperly hindered competition. The record shows Ethicon's persistent and improper innuendos. However, U.S. Surgical reasonably countered this aspect with evidence and argument concerning the purpose of the patent system. Review of the record leads us to conclude, as apparently did the district court, that this tactic did not prejudice the outcome. *See City of New York v. Pullman, Inc.*, 662 F.2d 910, 917 (2d Cir. 1981) ("The district court is not obliged to charge every contention made by the parties at trial, as long as the charge itself, taken as a whole, is fundamentally fair.") (citations omitted), *cert. denied*, 454 U.S. 1164 (1982). The denial of these instructions (and others offered by both sides) was not a miscarriage of justice, and does not establish reversible error or grounds for a new trial.

U.S. Surgical also argued that its requested instructions construing the claims should have been given, and that the absence of "claim construction" by the district court required a new trial. In accordance with the Court's remand for further consideration in light of *Markman*, we have again reviewed the requested instructions to determine whether any instructions that were improperly refused could reasonably have prejudiced the jury's verdict of invalidity.

In evaluating the refused instructions, we look first at the instructions on claim construction that were given. The issue was interpretation of these means-plus-function claims and their application to find if there was infringement by the Ethicon devices. The district court instructed the jury how to interpret means-plus-function claim elements, and how to apply these claim elements to the accused devices, as follows:

Now, in interpreting the means plus function claim elements, you must determine the following:

One, what function is called for by the claim element, and

Two, what structure, or means, is described in the patent specifications for performing the stated function.

A means plus function claim is only infringed if:

One, the function of the accused device is identical to

the function disclosed in the claim element of the patent; and

Two, the structure which performs that function in the accused device is the same as, or the equivalent of, the structure described in the patent specifications.

The second of these two steps requires you to determine whether the accused device includes the same structure as described in the patent or its equivalent. You *1235 may determine that a structure in the Ethicon device is equivalent if you determine that a person of ordinary skill in the art would consider the structure found in the accused device an insubstantial change from the structure disclosed in the patent specification.

This aspect did not concern, or determine, validity in this case. However, U.S. Surgical states that *Markman* requires the trial judge to perform the first portion of this instruction, that is, to determine the function and the structure or means that performs the function, and to give a detailed technical analysis for the infringement portion of the instruction; and that failure to do so fatally flawed the trial.

For example, U.S. Surgical requested instructions for the first element of claim 1 of the '057 patent, starting with the following proposed claim construction:

Clause i) of claim element 1b) reads "means for storing a plurality of surgical clips." This is a means-plus-function claim element. The stated function, as I interpret it, is to store a plurality of surgical clips.

We observe that this part of the proposed claim construction merely repeats the words of the claim. The requested instruction then told the jury what structure was described in the patent specification for performing this function:

The structure or means disclosed in the patent specification for performing this function is a clip track which holds an array of surgical clips and a spring to bias the clips toward the distal or far end of the instrument.

This information from the specification resolved no dispute, for there was none. Next, the requested instruction told the jury how to find infringement: the same instruction as in the general jury instruction that was actually given, quoted *supra*, but now drawn specifically to this claim element:

In order to find that this claim element of the '057 patent has been met, you must first find that defendants' accused devices perform the function of storing a plurality of clips. Then you must find that the defendants' accused devices have a clip track which holds an array of surgical clips and a spring to bias the clips toward the distal or far end of the instrument, or equivalent structure, which performs this function.

This text, again, repeated the function in the same words as in the claim, and repeated the undisputed description in the specification. The requested instruction then stated that if the accused devices perform this function, using the described means or an equivalent means, there is infringement. That is the same instruction as in the general instruction that was actually given, but made specific to this claim element. We doubt that *Markman* requires the trial judge to instruct as to an undisputed "claim construction" for every term, by simply parroting the words of the claim and then repeating the rule concerning infringement of means-plus-function claims. *Markman* explicitly recognized that the application of the claim to the accused device was for the jury. Indeed, Ethicon objected to this instruction as an improper attempt to direct the jury findings of infringement.

Similar instructions were proffered for the other claim elements. Another rejected instruction started with a similar repetition of the words of the claim as "interpreted" by the judge, and an undisputed restatement of what these words mean:

The final clause of claim element b) ii) calls for "clip closing means for sequentially closing said surgical clips." This is a means-plus-function claim element. The stated function of this particular means-plus-function claim element is "sequentially closing said surgical clips." I interpret this to mean the closing of surgical clips one at a time and one after the other.

In the infringement trial, the issue was not the definition of "sequentially," but the equivalency of the means that was described in the specification with the means that was used in the accused device, and issues concerning the clip advancing means. These aspects do not relate to obviousness, but to infringement. The additional text of this proposed instruction was objected to on its merits by Ethicon as an incorrect application of the law of 35 U.S.C. Section 112 Para.6. However, this aspect raised no disputed issues with respect to the determination of obviousness in view of the prior art. The dispute concerning the requested instructions related not to the prior art, but to the

accused Ethicon devices.

Following is another claim element whose proffered "interpretation" was to repeat the words of the claim:

Claim element a) calls for a trocar having a cannula with valve means for sealing the cannula. The claim element "valve means for sealing said cannula" is a means-plus- function claim element. The stated function, as I interpret it, is to seal the cannula.

There were infringement disputes concerning the valve means, and there was much debate at trial concerning the scope of this claim element as applied to Ethicon's devices. U.S. Surgical requested the instruction that the "valve means" includes and is infringed by all prior art valves and gaskets *1236 and any other known structures for sealing the cannula:

The structure for performing this function includes all such structures contained in trocars known in the art at the time the '420 Patent Application was filed. Such trocars contain structures both to seal the cannula when no instrument is in the cannula, such as a flapper-type valve, and structures which form a seal between the instrument and the cannula when an instrument is inserted in the cannula, such as a gasket. The flapper valve may engage the gasket, as in the U.S. Surgical Surgiport Trocar, or be separate from the gasket, as in reusable instruments that were known at the time the '420 Patent Application was filed. Therefore, if you find that the Ethicon Endopath Trocar is a trocar having the same or equivalent structure to the structures I have just described, then the accused devices satisfy claim element a) of Claim 1 of the '420 Patent.

We referred *supra* to this requested instruction, for it makes clear that validity of the U.S. Surgical patents was not grounded on asserted unobviousness of the valve means, and that a reasonable jury could have so found. The district court had left to the jury the issue of breadth of the valve means as it affected infringement, for Ethicon had vigorously objected to this instruction as prejudging the finding of infringement. In his post-trial opinion, the district judge expressed the view that the jury had accepted U.S. Surgical's construction of the valve means since it found infringement of the '420 patent claim. We do not reach the issue of infringement. However, whether the valve means was construed as broadly as U.S. Surgical requested, or quite narrowly as Ethicon had argued, the variety of valve structures shown in the prior art was in accordance with the jury's finding of obviousness in

light of the prior art.

[2] The *Markman* decisions do not hold that the trial judge must repeat or restate every claim term in order to comply with the ruling that claim construction is for the court. Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement. It is not an obligatory exercise in redundancy. Although claim construction may occasionally be necessary in obviousness determinations, when the meaning or scope of technical terms and words of art is unclear and in dispute and requires resolution in order to determine obviousness, in this case none of these rejected instructions was directed to, or has been shown reasonably to affect, the determination of obviousness.

Grounds for a new trial have not been shown. See *Santa Maria v. Metro- North Commuter R.R.*, 81 F.3d 265, 273 (2d Cir. 1996) ("A new trial must be granted if the court determines that the verdict is against the weight of the evidence, that the damages are excessive, or that, for other reasons, the trial was not fair to the party moving.") (quoting *Montgomery Ward & Co. v. Duncan*, 311 U.S. 243, 251 (1940)); *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 626, 225 USPQ 634, 643 (Fed. Cir. 1985) ("If prejudicial error occurred, or if the verdict is against the clear weight of the evidence, as an alternative to judgment n.o.v. a new trial may be granted, in the discretion of the trial judge.") (citing *Fairmont Glass Works v. Cub Fork Coal Co.*, 287 U.S. 474 (1933)).

We have not been shown prejudicial error in the jury instructions, or that the verdict of obviousness is against the clear weight of the evidence, or that substantial justice requires that the trial be voided.

The Dictionary

During its deliberations the jury requested a dictionary and, over the objections of both parties, was provided one by the court. U.S. Surgical states this is reversible error, while Ethicon states that any error was harmless.

U.S. Surgical proposes that the jury might have used the dictionary to look up definitions on which it had been instructed by the court or that had been explained by witnesses, such as "presumption" or "obviousness." The jury was instructed, as the parties agreed, to

consider the ordinary meaning of the language used in the claims. U.S. Surgical does not mention any terms that were used outside of their ordinary meaning. The district court pointed out in its post-trial opinion that the instruction to consider the ordinary meaning, and the general assumption that definitions in a standard dictionary are common knowledge with which the jury is charged, support the provision of the dictionary.

[3] It is generally agreed that the provision of a dictionary to a jury, although not favored, is not grounds for a new trial. See *Wernsing v. General Motors Corp.*, 470 A.2d 802, 806 (Md. 1984) ("It appears to be the near universal consensus that a new trial is not awarded simply because a dictionary was before the jury.") (citing cases). U.S. Surgical offered no specifics as to words whose dictionary definitions may have adversely affected the verdict of obviousness. *1237 Instead, U.S. Surgical seeks a presumption of prejudice and an automatic new trial.

Both sides cite *United States v. Weiss*, 752 F.2d 777 (2d Cir. 1985), as stating the controlling law in the Second Circuit, and each side argues that *Weiss* supports its position. In *Weiss* a criminal defendant was convicted of mail fraud, perjury, and RICO violations, and the jury obtained accounting books without the judge's knowledge or consent. Although the Second Circuit stated that "extra-record information that comes to the attention of a juror is presumptively prejudicial," 752 F.2d at 782-83, the court held that the trial judge's determination that the information had not prejudiced the defendant was not an abuse of discretion, and sustained the conviction.

U.S. Surgical argues that the practice of permitting the jury to have a dictionary would undermine the patentee's right to be its own lexicographer, and thus constitutes reversible error. However, U.S. Surgical does not direct us to any actual or reasonably possible prejudice, or any suggestion that the jury disregarded the court's instructions on the law of obviousness, or the plain meaning of the terms used in the claims and the prior art. Instead, U.S. Surgical argues that it was Ethicon's burden to establish that the jury did not misuse the dictionary, and that since that burden can not be met a new trial is required. However, the holding in *Weiss* was not for an automatic new trial. *Weiss* did not divest the trial judge of authority to decide whether the error, in that case viewed as juror misconduct, was in fact prejudicial.

The district court did not commit prejudicial error by providing the dictionary. A new trial on this ground is

not warranted.

The Post-Trial Motions

Upon post-trial motions the district court, in a 34-page opinion, discussed validity and infringement. With respect to validity the court discussed the positions of the parties on the teachings of the prior art, the differences between the prior art and the patented inventions, and how the inventions as a whole would have been viewed by a person of ordinary skill in that art.

The district court summarized the evidence that the prior art would have suggested the combination claimed in the '420 patent. The court referred to Ethicon's position that U.S. Surgical had adapted its own multiple clip applier to endoscopic use, and the testimony that the only significant difference from the prior art multiple clip applier was the elongation of the shaft and the seal, and that these were common to all endoscopic instruments.

The district court explained its conclusion that there was substantial evidence in support of the jury verdict of obviousness of the claims in suit. The court also explained its conclusion that the requirements of a new trial had not been met: that the verdict was not against the weight of evidence, that there was not a miscarriage of justice or prejudicial error during trial, or a seriously erroneous result.

The Motion Upon Remand

Following the remand from the Supreme Court to the Federal Circuit, U.S. Surgical moved this court to vacate the district court's judgment and order a new trial, on the ground that since the district court had not construed the claims as required by *Markman*, either before or after the jury rendered its verdicts, there is nothing for the Federal Circuit to review on appeal. U.S. Surgical states that it is entitled to a new trial of all issues of validity and infringement except for the verdicts in its favor (infringement of the '420 patent and that there was not inequitable conduct) for which Ethicon did not petition for *certiorari*.

Ethicon, opposing the motion, points out that the district court, in its opinion on the post-trial motions, discussed the claim construction that the jury necessarily adopted on the two aspects of claim scope that were in genuine dispute as applied to the Ethicon devices. Ethicon points out that the district court stated that it agreed with the jury's necessary constructions

with respect to the valve means and the clip advancing means, and that the court explained its reasons for sustaining the verdicts based on those constructions. Ethicon points out that under *Markman* this court undertakes to perform any necessary claim construction *de novo*. Ethicon also points out that no disputed claim construction was material to the determination of obviousness.

[4] Concerning U.S. Surgical's proposed instructions on claim construction, as we have discussed, whatever their applicability to the issues of infringement, their omission did not prejudice the issue of obviousness. *Markman* did not hold that the trial judge must always parse the claims for the jury, whether or not there is an issue in material dispute as to the meaning or scope of the claims. Neither this court nor the Supreme Court held that the trial judge must conduct such a rote exercise, on pain of having to retry the case.

Ethicon had objected to the substance of U.S. Surgical's proposed instructions, as well as asserting that they were unnecessary. We need not resolve this issue, for U.S. Surgical *1238 has not shown that there are unclear or ambiguous technical terms or words of art or related aspects of claim scope whose "construction" as requested by U.S. Surgical would negate the verdicts of obviousness. The jury was instructed, without objection, that the language of the claims was to have its plain meaning. There was no dispute as to the meaning of technical terms or words of art as used in either the prior art or the claims. The difference between the prior art and the claimed invention is a question of fact, *Graham*, 383 U.S. at 17, 148 USPQ at 467, and was not overruled by the Court's *Markman* decision.

U.S. Surgical argues that if the district court had construed the claims for the jury, the jury could not have reasonably accepted Ethicon's argument that U.S. Surgical had simply made known endoscopic adjustments in its prior art multiple clip applier. This went to the ultimate question of obviousness, which was decided by the jury upon finding and weighing and evaluating the factual evidence of the *Graham* factors. U.S. Surgical does not explain how any reasonable claim construction that it requested would have

deprived the verdict of obviousness of its support. Further, *Markman* does not authorize the trial judge to remove from the jury the factual findings required by *Graham*.

On careful consideration of the substance of the instructions on claim construction that the district court declined to give, and the instructions on the issue of obviousness, all in light of the particular issues in this case concerning the prior art, the claimed invention, and the Court's discussion in *Markman*, we conclude that the omission of the requested instructions did not prejudice the determination of obviousness. The criteria for grant of a new trial have not been met. *See Santa Maria*, 81 F.3d at 273; *Shatterproof Glass*, 758 F.2d at 626, 225 USPQ at 643 (new trial appropriate when there was prejudicial error, or when verdict against weight of the evidence).

Conclusion

On review of the proceedings at trial, we conclude that there was substantial evidence from which a reasonable jury could have held that the claimed subject matter would have been obvious to a person of ordinary skill in this field at the time the invention was made. The judgment of invalidity is affirmed.

The case was vigorously litigated, with extensive testimony, physical exhibits, and argument. We have been directed to no unfairness or incompleteness or prejudice in the jury instructions with respect to obviousness. A new trial was properly denied.

Costs

Costs to Ethicon. **AFFIRMED; MOTION FOR NEW TRIAL DENIED.**

FN1 *U.S. Surgical Corp. v. Ethicon, Inc.*, No. 5:92 CV 00134 (AVC), (D. Conn. Feb. 11, 1993 (Summary Judgment); February 18, 1994 (Judgment Order); June 9, 1994 (Ruling on Post-trial Motions)).

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Appendix 9: *In re McLaughlin*, 443 F.2d 1392, 170 U.S.P.Q. 209 (C.C.P.A. 1971)

In re McLaughlin

Court of Customs and Patent Appeals

No. 8474

Decided June 24, 1971

United States Patents Quarterly Headnotes

PATENTS

[1] Patentability -- Anticipation -- Combining references (§ 51.205)

Test for combining references is not what individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art.

PATENTS

[2] Patentability -- Invention -- In general (§ 51.501)

Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within level of ordinary skill at time claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, reconstruction is proper.

PATENTS

[3] Patentability -- Evidence of -- Commercial success -- In general (§ 51.4551)

Recognizing that inference of obviousness drawn from prior art disclosures is only prima facie justification for drawing ultimate legal conclusion that claimed invention is unpatentable under 35 U.S.C. 103, it is imperative that such secondary considerations as commercial success and adaptation by competitor also be evaluated in determining final validity of that legal conclusion; this is true even where claimed invention involves only relatively simple mechanical concepts.

PATENTS

Particular patents--Railway Cars

McLaughlin, Compartment Arrangement for Railway Cars, claim 15 of application allowed; claims 13 and 14 refused.

***210** Appeal from Board of Appeals of the Patent Office.

Application for patent of Gerald McLaughlin, Serial No. 566,701, filed July 5, 1966; Patent Office Group

317. From decision rejecting claims 13 to 15, applicant appeals. Affirmed as to claims 13 and 14; reversed as to claim 15.

Norman Lettvin, Chicago, Ill., for appellant.

S. Wm. Cochran (R. V. Lupo of counsel) for Commissioner of Patents.

Before Rich, Almond, Baldwin, and Lane, Associate Judges, and Re, Judge, United States Customs Court, sitting by designation.

Baldwin, Judge.

McLaughlin has appealed from the decision of the Patent Office Board of Appeals sustaining the rejection of claims 13, 14 and 15 in his application [FN1] as unpatentable under 35 U.S.C. 103 in view of the prior art. One claim has been held allowable.

The Invention

The subject matter of the claims on appeal may be characterized as an improved construction arrangement for railroad "boxcars" which are adapted for carrying "unitized" cargo. The latter term is defined by appellant as "cargo that is loaded upon a cargo-handling platform (such as a pallet or slip sheet) of a pre-selected size, and which is arranged for transfer between stations by devices such as fork-lift trucks."

Appellant states that prior art arrangements, having the doorways located substantially centrally in the opposed sidewalls, leave the center of the car unsuitable for holding additional pallets securely because side filler panels cannot be placed over the doorways without inconveniencing loading and unloading.

The present invention, as represented in Figure 2 of the application, which we reproduce below along with Figure 3, is alleged to permit a larger volume of freight to be conveniently loaded in a car with the same overall dimensions.

Image 1 (1.5 X 4) Available for Offline Print

***211**

Image 2 (2.5 X 3.25) Available for Offline Print

The car used in this arrangement has the door

openings 39 (left hand occurrence) and 40 in the opposite sidewalls offset longitudinally so that each sidewall includes a long wall section and a short wall section on opposite sides of the opening. Side filler panels 43 and 45 are affixed to the interiors of the long wall sections 37 and 34, respectively, and longitudinally adjustable bulkheads 47 and 48 are provided. The car is shown completely filled with groups of palletized containers 51 and 52, secured in position by the side filler panels and bulkheads. The application describes the loading of this car as follows:

Typically, the load dividers 47 and 48 are initially moved to the left of doorway 40 to permit free access to the floor surface area in the "deep end" of the car bounded by end wall 30. The pallets 51 are placed into the car in sequence, adjusting the side fillers to the necessary width required to firmly confine the pallets in place. During this time, door 49 is already closed to form the lateral support for the six pallet stacks 51 nearest load divider 48. The load divider 48 is then moved into position against the stacked pallets 51 and locked in place. The second load divider 47 is then temporarily positioned closely adjacent load divider 48 to permit free access to the "short end" of the car terminated by end wall 31. Pallets 52 are then sequentially placed in position, adjusting the side fillers 45 to retain these pallets against lateral shifting. The three side fillers in the series 45 which are closest to the load divider 47 are preadjusted prior to loading the six pallet stacks 52 nearest load divider 47. Finally, load divider 47 is moved into tight engagement with the stacked pallets 52, locked in place, and the door 50 is closed to secure the pallets 52.

The only independent claim on appeal is claim 13 which we reproduce as follows:

13. An improved car-loading construction for use in elongated, wall- enclosed railway cars of the type utilizing therein longitudinally movable load-confining transverse bulkheads which are adapted to be located generally centrally of the ends of the car to project across substantially the entire width of the car;

said improved car-loading construction comprising, in combination,

the longitudinal side walls of the car each having a single doorway therein located between the ends of the wall to divide the wall into spaced long and

short sections,

the doorways being offset toward different ends of the car so that the major portion of each doorway is directly opposite the long wall section of the opposing side wall, and

side filling panels mounted on the inside surface of each of said long wall sections and being adjustable toward and away from the corresponding long wall section, so that the transversely adjustable side filling panels on one long wall section and a longitudinally adjustable transverse bulkhead may cooperate to substantially fully enclose the load in one end of the car substantially to the mid-point of the car without adversely affecting the ability to load the other end of the car.

Claim 14 adds the additional limitations that the car is adapted to carry pallet-mounted loads and the lengths of the side walls of the car conform substantially to whole multiples of a dimension of a pallet. Claim 15 further provides that the portion of each doorway directly opposite a wall is "substantially equal *212 to a plural multiple of a dimension of the pallet" and that the rest of the doorway is narrower than a pallet dimension.

The Rejection

Claims 13, 14 and 15 were rejected as unpatentable over Cook [FN2] in view of either Robertson [FN3] and Aquino [FN4] or of Lundvall, [FN5] under 35 U.S.C. 103.

Cook discloses a railway box car having sides defining oversized door openings in diagonally opposite ends of the car. That construction is described as facilitating loading and unloading lumber, permitting it to be palletized and to be handled by lift trucks.

Lundvall discloses a railway car provided with adjustable side filler panels for preventing lateral shifting of the load and adjustable bulkheads to hold the load against longitudinal shifting.

Robertson discloses a specific side filler panel construction for railway cars and Aquino is directed to a bulkhead construction for similar use.

The examiner and board based their holdings that the appealed claims are unpatentable on the view that persons of ordinary skill in the art would find it

obvious to use bulkheads and side filler panels, as disclosed in the secondary references, in connection with loads placed in a car of the Cook construction.

Opinion

Appellant has strenuously urged that the reference disclosures were improperly combined. In particular, with regard to Cook, he argues that, while the reference does show elongated, longitudinally offset doors, it does not suggest such an arrangement *in combination* with a bulkhead and side fillers because of the patentee's expressed desire to have a car capable of being loaded and unloaded simultaneously from both sides, which is not the desire of appellant nor even possible, he urges, with his arrangement.

[1] We have taken the above argument into consideration and do find that it has some merit. Nevertheless, it is not convincing. It should be too well settled now to require citation or discussion that the test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the

[2] art. Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper. The Cook patent does indicate that the car shown therein is suitable for carrying palletized loads with lift trucks being used for the loading and unloading, including stacking of the pallets. Since the secondary references show that it was well known to use side filler panels and bulkheads to confine palletized loads to prevent lateral and longitudinal shifting, we agree that those references would have suggested use of such panels and bulkheads with the Cook car for the same purpose.

[3] The foregoing conclusion in itself, however, is not determinative of the present appeal. Appellant has submitted evidence tending to prove that his invention has solved the longstanding problem of utilizing the maximum amount of space in standard, 50-ft. boxcars, permitting loading the car with 56 pallets of 48' x 40', whereas prior to the invention, cars of that size could be loaded with only 46 such pallets properly confined. The evidence, comprising two affidavits and a series of exhibits, indicates that

the invention has been commercially successful and that its concept was promptly adapted by a competitor. Recognizing that the inference of obviousness drawn from the prior art disclosures is only *prima facie* justification for drawing the ultimate legal conclusion that the claimed invention is unpatentable under 35 U.S.C. 103, it is imperative that such secondary considerations also be evaluated in determining the final validity of that legal conclusion. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). We emphasize that such is true even where, as here, the claimed invention involves only relatively simple mechanical concepts. As we have said on another occasion: "A patentable invention, within the ambit of 35 U.S.C. 103, *may* result even if the inventor *has*, in effect, merely combined features, old in the art, for their known purpose, without producing anything beyond the results inherent in their use." *In re Sponnoble*, 56 CCPA 823, 405 F.2d 578, 160 USPQ 237 (1969).

The first affidavit was by appellant, himself, the manager of the Customer Relations Department of the Equipco division of Unarco Industries, Inc., the assignee of the application. He asserts that 355 railway cars *213 equipped for use with his invention, valued at nearly eight million dollars, were ordered within little more than a year. Included with this affidavit are a series of reproductions of trade journal articles and advertisements tending to support the further assertion made in the affidavit, that the problem of effectively utilizing space was a familiar one. One exhibit is a copy of the advertisement of a competitor, tending to indicate that appellant's concept was adopted by that competitor. The other affidavit is by John Clement, general traffic manager with the Corn Products Co. and apparently a disinterested third party. The affiant states that he has the duty of obtaining all the railroad and other types of cargo equipment necessary for shipping the company's products and that he became interested in the invention immediately upon its being disclosed to him because it appeared to solve problems presented by prior railway car arrangements, allowing use of substantially the entire cargo carrying capacity of the car while permitting truck loading. The affidavit further states that Corn Products had already received 10 cars possessing the proposed arrangement, had ordered 11 more and was negotiating for an additional forty.

The examiner did not consider the affidavits persuasive. That of Clement he characterized as alleging that appellant's arrangement is more versatile than prior arrangements without advancing any factual

support. He regarded appellant's own affidavit as lacking sufficient facts to show that the asserted commercial success resulted from the invention as claimed. The board did not comment on either affidavit in its opinion.

Our own consideration of the affidavits in light of appellant's arguments convinces us that there was a problem in the art due to floor space in the mid-section of cars with side doorways not ordinarily being usable for palletted goods which require securing against transverse and lateral shifting. Moreover, the favorable opinion Clement expressed of the invention and the showing of extensive purchases of equipment for utilizing it indicate that appellant provided an unobvious solution of the problem. The affidavits reveal the solution as involving the arrangement substantially as described in applicant's application. Thus an arrangement is required wherein the relationship of the dimensions of the long and short wall sections and the door openings of the car are such that the pallets may be machine-loaded substantially to its full capacity. We note that these features are brought out fully only in claim 15 which recites that the long and short sections of the side walls are substantially equal to whole multiples of a dimension of a pallet and that the portions of the doorway directly opposite each other have a width equal to a plural multiple of a dimension of a pallet. As to that claim, we find appellant's secondary evidence adequate to rebut the initial inference of obviousness and, accordingly, reverse the decision of the board.

On the other hand, the affidavit showings do not demonstrate that an arrangement lacking any of the characteristics defined in claim 15 solved the previous space-utilization problem or that the commercial success was due to less than all of those features. As to claims 13 and 14, thus, the *prima facie* case of obviousness made out by the prior art stands un rebutted and the board's decision pertaining thereto must be sustained.

The decision of the board is *affirmed* as to claims 13 and 14 and *reversed* as to claim 15.

FN1 Serial No. 566,701, filed July 5, 1966, for "Compartment Arrangement for Railway Cars."

FN2 Patent No. 2,930,332, granted March 29, 1960.

FN3 Patent No. 3,212,458, granted October 19, 1965.

FN4 Patent No. 3,217,664, granted November 16, 1965.

FN5 Patent No. 3,163,130, granted December 29, 1964.

Cust. & Pat.App.

170 U.S.P.Q. 209

END OF DOCUMENT

Appendix 10: *In re Young*, 927 F.2d 588, 18 U.S.P.Q.2d 1089 (Fed. Cir. 1991)

In re Young

Court of Appeals, Federal Circuit

No. 90-1368

Decided March 5, 1991

United States Patents Quarterly Headnotes

PATENTS

[1] Patentability/Validity - Obviousness - Relevant prior art - In general (§ 115.0903.01)

Apparently conflicting prior art references must, in making obviousness determination, each be weighed for their power to suggest solutions to artisan of ordinary skill, and all disclosures in prior art must be considered to extent that they are in analogous fields of endeavor and thus would have been considered by person of ordinary skill in field of invention; in weighing suggestive power of each reference, degree to which one reference might accurately discredit another must be considered.

PATENTS

[2] Patentability/Validity - Obviousness - Relevant prior art - Particular inventions (§ 115.0903.03)

Applicant's claims for method of generating seismic pulse in water by use of at least three air guns disposed at critical distance from each other are obvious in view of prior patent which expressly teaches exact spacing set forth as limitation in each of applicant's claims, even though additional reference purporting to test different methods of pulse generation suggests avoidance of spacing taught in prior patent, since reference did not accurately test prior patent according to its teachings, particularly those regarding spacing, and therefore artisan of ordinary skill would have afforded reference little weight.

***1090** Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of D. Raymond Young and John C. Wride (method and apparatus for generating an acoustic pulse in a body of water). From decision of Board of Patent Appeals and Interferences upholding final rejection of all claims, applicants appeal. Affirmed.

Richard F. Phillips, Jr., Houston, Texas, for appellants.

Lee E. Barrett, associate solicitor (Fred E. McKelvey, solicitor, with him on brief), Arlington, Va., for appellee Patent and Trademark Office.

Before Newman, Lourie, and Rader, circuit judges.

Rader, J.

Raymond Young and his co-inventor John Wride (collectively Young) appeal from the October 31, 1989 and April 18, 1990 decisions of the Board of Patent Appeals and Interferences (Board). These decisions affirmed the final rejection of all claims in their application. The Board held Young's claimed invention obvious under 35 U.S.C. § 103. This court affirms.

BACKGROUND

Young's application discloses a method and apparatus for generating an acoustic pulse in water. Acoustic pulse technology facilitates offshore seismic exploration. The acoustic pulse generates a large gas bubble in the ocean above geological formations on the ocean floor. The rapid expansion and collapse of the gas bubble create a shock wave in the water. The shock wave propagates through the water into the formations below the ocean bed. As the shock wave passes downward through these formations, each interface between adjoining earth strata reflects a portion of the shock wave. These reflections move upward through the ocean. Hydrophones at the ocean's surface can monitor these reflections. From these monitored reflections, geologists can generate a "seismic section" map which shows the configuration of strata in the ocean bed.

Today's most common sources of seismic shock waves are air guns. These air guns feature a chamber for storing and releasing on command highly compressed air. A high-pressure hose charges the gun with compressed air for rapid firing during a seismic survey.

Acoustic pulse technology suffers from problems with bubble oscillation. Upon release of the compressed air, the bubble undergoes a rapid initial expansion and collapse. Several more expansions and collapses follow the initial collapse, but with diminishing amplitude. Each of these expansion-collapse events creates an additional shock wave. The geological strata reflect each of these additional shock waves. The

multiple reflections, in turn, blur the resolution of the seismic section. Most blurring comes from the first oscillation after the initial bubble collapse.

Acoustic pulse technology uses a "primary-to-bubble ratio" to measure susceptibility to oscillation. This ratio compares the shock wave intensity of the initial expansion-collapse to the intensity of the first oscillation. A high ratio means the secondary shock waves are less likely to blur the seismic section.

Young tries to raise the primary-to-bubble ratio above prior art air gun sources by reducing the amplitude of the first oscillation. Young seeks this result by spacing at least three air guns in a characteristic array. The array separates the guns from each other by a critical distance. The distance, D , is at least 1.2 times greater than R , but less than or equal to twice R . R is the maximum radius of the initial air bubble from each gun. [FNa1] With this spacing, the bubbles from each gun intersect before any single bubble reaches its maximum radius. This intersection dampens the overall oscillation. Young's independent claims each include a spacing limitation within this range.

Independent claim 1 is illustrative: A method of producing a seismic pulse in a body of water, including the steps of:

(a) disposing in the water a set of at least three air guns, each adapted to produce in the water a gas bubble having maximum radius substantially equal to the quantity R , where the guns are disposed at depths such that each produces, when fired, a bubble of maximum radius R , and the guns are disposed such that each gun is separated from each of the nearest guns thereto in the set by a critical distance, D , where D is substantially equal to $\sqrt{2}R$; and

(b) firing the air guns substantially simultaneously to produce a seismic pulse in the water.

***1091** Young's dependent claims define the number of the guns or their placement relative to each other or to the ocean surface.

The examiner rejected each of the claims as obvious under 35 U.S.C. §103 in light of five prior art references. The examiner relied primarily on U.S. Patent No. 2,619,186 to Carlisle (the "Carlisle patent" or "Carlisle") to reject Young's claims. Carlisle is the only reference cited by the examiner or Board which suggests the air gun spacing in Young's claims.

Young contested the Board's and the examiner's consideration of Carlisle. Young argued that Carlisle concerns reducing bubble oscillation for chemical explosives, not air guns. Young also argued that an article by Knudsen published six years after Carlisle in the journal *Geophysics* expressly discredits the teachings of Carlisle. W. Knudsen, *Elimination of Secondary Pressure Pulses in Offshore Exploration (A Model Study)*, 23 *Geophysics* No. 3 at 440 (July 1958) (Knudsen). Therefore, Young contended, a person of ordinary skill in the seismic exploration art would not have considered Carlisle when developing an improved seismic array.

The Board rejected Young's arguments. The Board held that the examiner appropriately applied Carlisle notwithstanding the teachings of Knudsen. On appeal, Young asserts as error only the propriety of applying Carlisle as a reference in light of Knudsen's allegedly contrary teachings.

DISCUSSION

This court must decide whether the Board properly affirmed the examiner's rejection over Carlisle. Young has not challenged the other references cited in the examiner's rejection. Further, Young has not argued the merits of any particular claim apart from the others. Therefore, all claims stand or fall together with representative independent claim 1. *See In re Kaslow*, 707 F.2d 1366, 1376, 217 USPQ 1089, 1096 (Fed. Cir. 1983).

The Carlisle patent - "Seismic Exploration Method" - issued on November 25, 1952. Carlisle concerns minimizing bubble oscillation for chemical explosives used in marine seismic exploration. Carlisle controls bubble oscillation by spacing seismic sources to achieve a reduction of the secondary pressure pulse. Carlisle specifically teaches spacing the seismic sources close enough to allow the bubbles to intersect before reaching their maximum radius. Carlisle spaces the bubble centers closer than two maximum bubble radii, or less than "2.0 R " in Young's notation. Carlisle, col. 3, lines 57-60. Carlisle explains:

[T]he secondary energy normally available from these sources is dissipated by their mutual intersection and tends to eliminate the secondary seismic impulses created when the walls of the bubbles collapse.

Id. at lines 60-64. Thus, Carlisle expressly teaches the spacing limitation in each of Young's claims.

Notwithstanding Carlisle's teachings, Young argues that the Knudsen article discredits Carlisle. Knudsen describes a series of tests which evaluated four proposed techniques for suppressing bubble oscillation. Carlisle was one of the four. Knudsen's article opined that Carlisle yields no appreciable improvement in bubble oscillation suppression. The effective teaching of the Knudsen/Carlisle combination, Young argues, suggests avoidance of the spacing suggested in Carlisle. Therefore, Young would have this court conclude that his use of Carlisle's spacing would not have been obvious.

Young misunderstands the effect that Knudsen has on Carlisle. The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). Even if tending to discredit Carlisle, Knudsen cannot remove Carlisle from the prior art. Patents are part of the literature of the art and are relevant for all they contain. *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968). For example, in *In re Etter*, 756 F.2d 852, 859, 225 USPQ 1, 6 (Fed. Cir.), *cert. denied*, 474 U.S. 828 (1985), a reference which disclosed obsolete technology remained in the prior art. This court considered the reference for what it disclosed in relation to the claimed invention.

[1] When prior art contains apparently conflicting references, the Board must weigh each reference for its power to suggest solutions to an artisan of ordinary skill. The Board must consider all disclosures of the prior art, *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976), to the extent that the references are, as here, in analogous fields of endeavor and thus would have been considered by a person of ordinary skill in the field of the invention. The Board, in weighing the suggestive power of each reference, must consider the degree to which one reference might accurately discredit another.

[2] As prior art, the Board correctly weighed Carlisle to determine the patentability of Young's claims. Carlisle expressly teaches both the method and the advantages *1092 of Young's claimed spacing. In fact, Carlisle expressly teaches the exact spacing set out as a limitation in Young's claims. Thus, the Board correctly attributed significant weight to Carlisle in its obviousness determination.

In determining what weight to accord to Carlisle as prior art, the Board also appropriately considered

Knudsen's discrediting effect. The Board determined that Knudsen did not convincingly discredit Carlisle. Therefore, the Board appropriately concluded that Knudsen would not have led one skilled in the art to reject Carlisle.

Knudsen did not test Carlisle according to its teachings. For instance, Knudsen did not use an explosive charge in modeling Carlisle. Rather, Knudsen tried to simulate Carlisle with a capacitive electrical discharge in a barrel of oil.

Knudsen did not replicate Carlisle's teachings on spacing. Knudsen tried to model Carlisle by separating the seismic sources by one, two and three bubble radii. Knudsen at 42. At the maximum spacing of three bubble radii, the bubbles will not intersect at all. Carlisle specifically requires spacing to permit bubble intersection. Carlisle, col. 4, lines 47-52. At a spacing of one bubble radius, the two bubbles coalesced into one before the initial collapse. Knudsen at 45. If just one bubble is present, the bubble will oscillate as if no second seismic source was present. Carlisle specifically requires spacing to prevent the formation of one bubble. Carlisle, col. 4, lines 34-37. Finally, at the two bubble radii spacing in Knudsen, the bubbles will just barely intersect. Carlisle requires that the bubbles intersect before each bubble achieves its maximum radius. Carlisle, col. 3, lines 58-60. In sum, Knudsen did not duplicate or appropriately model Carlisle's spacing.

Knudsen's conclusion that Carlisle would "not be effective in eliminating the secondary pressure pulse" also directly contradicts data contained in Knudsen. The Knudsen data point for the two-radii horizontal bubble spacing, although not a completely accurate model of Carlisle, shows a 30% reduction of the secondary pressure pulse. Knudsen at 45, Table 4. This data point represents the only point where Knudsen approximates the spacing shown in Carlisle. At that point, Knudsen confirmed Carlisle's teachings.

The Board found that Knudsen "did not test the Carlisle technique under conditions which are directly comparable to the Carlisle disclosure." Weighing the discrepancies between the Knudsen model and Carlisle's teachings, as well as Knudsen's tendency to confirm Carlisle where the model approximated Carlisle, the Board concluded: "we do not agree that Knudsen discredits Carlisle."

Because Knudsen did not accurately test Carlisle, an artisan of ordinary skill would not have dismissed

Carlisle in light of Knudsen as a whole. It is far more likely that the skilled artisan would have afforded little weight to Knudsen itself. The Board did not err in relying on Carlisle and discounting Knudsen.

CONCLUSION

Knudsen is not so credible or persuasive of a contrary teaching that it would have deterred the skilled artisan from using the teachings of Carlisle. The examiner's use of Carlisle in his rejection of Young's claims is not

clearly erroneous. The Board's decision affirming the examiner's rejection is therefore *AFFIRMED*.

FNal Mathematically, D is defined by $1.2 R \leq D \leq 2.0 R$.

C.A.Fed.

18 U.S.P.Q.2d 1089

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Appendix 13: *In re Carlson*, 983 F.2d 1032, 25 U.S.P.Q.2d 1207 (Fed. Cir. 1992)

In re Carlson

Court of Appeals, Federal Circuit

No. 92-1248

Decided December 16, 1992

United States Patents Quarterly Headnotes

PATENTS

[1] Patentability/Validity -- Anticipation -- Prior art (Section 115.0703)

Patentability/Validity -- Obviousness -- Relevant prior art -- In general (Section 115.0903.01)

German "Geschmacksmuster," which is design registration obtained by applicant from German government after performing certain registration procedures, including deposit, qualifies as foreign patent for purposes of 35 USC 102(a), since it is completely "available to the public," even though actually viewing such design in German city may impose burden, since such burden is imposed by law upon hypothetical person of ordinary skill in art who is charged with knowledge of all contents of relevant prior art, and since actual knowledge of Geschmacksmuster is not required, in that hypothetical person is presumed to know all pertinent prior art, whether or not applicant is actually aware of its existence.

PATENTS

[2] Patentability/Validity -- Obviousness -- Relevant prior art -- Particular inventions (Section 115.0903.03)

Patentability/Validity -- Design patents (Section 115.17)

Design for dual compartment bottle is obvious in light of prior art, even though prior art references emphasize asymmetry, whereas claimed design is symmetrical around plane vertically bisecting bottle midway between bottle caps, since, in field of art in which products are deliberately designed as asymmetrical in order to create distinctive, memorable images, it would have been obvious to create "normal," or symmetrical, orientation for design.

PATENTS

Particular patents -- Design -- Bottle

Des. 289,855, Carlson, dual compartment bottle, rejection, in re-examination proceeding, of claim as unpatentable affirmed.

*1208 Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Revlon Inc. and Smiletote Inc. filed request for re-examination of Des. 289,855. From decision of the Board of Patent Appeals and Interferences affirming examiner's rejection of claim as unpatentable, patentee Bradley C. Carlson appeals. Affirmed.

Malcolm L. Moore, of Moore & Hansen (Chad A. Klingbeil, with him on brief), Minneapolis, Minn., for appellant.

Jameson Lee, associate solicitor (Fred E. McKelvey, solicitor, with him on brief; John W. Dewhirst, Richard E. Schafer, Albin F. Drost, and Lee E. Barrett, of counsel), for appellee.

Before Nies, chief judge, and Lourie and Clevenger, circuit judges.

Clevenger, J.

Bradley C. Carlson appeals from the January 9, 1992 decision of the U.S. Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), Appeal No. 91-2823, affirming the examiner's rejection in reexamination proceeding No. 90/001,935 of the claim of U.S. Design Patent No. 289,855 (Des. 289,855) as unpatentable under 35 U.S.C. Section 103 (1988). We affirm.

I

The two issues raised in this appeal are whether the design protected by a German Geschmacksmuster constitutes an "invention . . . patented . . . in . . . a foreign country" within the meaning of 35 U.S.C. Section 102(a) (1988) and thus may be considered prior art, and whether Des. 289,855 is unpatentable under 35 U.S.C. Section 103 (1988) as obvious in light of the pertinent prior art.

The application that culminated in issuance of Des. 289,855 on May 19, 1987 was filed with the PTO by Carlson on November 19, 1984. The claim of Des. 289,855 covers the ornamental design for a dual compartment bottle as depicted in the six figures included in the design patent.

On April 6, 1990, the PTO granted a request for reexamination of Des. 289, 855 filed by Revlon, Inc.

and Smiletote, Inc., whom Carlson had accused of infringing Des. 289,855. During the reexamination, several references were considered which had not been before the examiner during prosecution of the initial application. The new references were (i) German Geschmacks muster No. 4244, issued to Firma Frankenwald-Presserei Horst Rebhan on May 9, 1984; (ii) U.S. Design Patent No. 86,749, issued to Salvatore Scuito on April 12, 1932, and entitled "Design for a Combined Flask and Drinking Glass Holder" (Scuito); and (iii) a magazine article entitled "News in Packaging," *Drug & Cosmetic Industry* (July 1978) (Redken article), illustrating the type of bottle cap used in Des. 289,855.

A Geschmacksmuster is a design registration obtained by an applicant from the German government after performing certain registration procedures. Professor Chisum, in a nutshell, thus describes the registration process in effect in 1984:

[A] person may register an industrial design or model by depositing with a local office an application with a drawing, photograph or sample of the article. Registration is effective on deposit, and lists of registered designs are published a short time after registration.

1 Donald S. Chisum, *Patents* Section 3.06 [2], at 3-107 (1992) (footnote omitted). The local office of deposit of a Geschmacksmuster in a *1209 city is the Amtsgericht, which is the local courthouse or seat of government of that city. The published list, which discloses certain particulars of each registration, is contained within the Bundesanzeiger, or Federal Gazette. The information typically disclosed in the Bundesanzeiger, with respect to a registered design, consists of a general description of the deposited design and the class of articles deposited, identifying numbers of the deposited designs, the name and location of the registrant, the date and time of registration, and the term of protection. In addition, the city location of the deposited design is also known because the published list is organized under city headings.

Certified copies of Geschmacksmuster are available from the Amtsgericht in which the registered designs are deposited. Such copies typically include the same information regarding the Geschmacksmuster as provided in the Bundesanzeiger, *supra*, including the city of deposit, and a copy of the drawing or photograph deposited. In the case of deposited sample articles, certified copies of Geschmacksmuster contain

photographs of the sample articles.

The Geschmacksmuster in this case embraces three different bottle designs, Nos. 3168-3170. Only Model No. 3168 is pertinent to the design claimed in Des. 289,855. That model is a bottle design consisting of two attached container portions divided by a striking, asymmetrical zig-zag line of demarcation. Each container portion has an externally threaded neck with an associated screw-on cap. As translated, both the Bundesanzeiger publication referring to the Geschmacksmuster and the certified copy of the Geschmacksmuster state, in relevant part: "An open package with plastic or synthetic bottles with stoppers. . . . Model for plastic products." The description as 'open' signifies that the deposited materials are available for public inspection. In addition, the certified copy of the Geschmacksmuster, which was supplied to the examiner as relevant prior art, includes a series of photographs of the three deposited designs taken from various orientations. The Bundesanzeiger identifies the German city of Coburg, Bavaria as the location of the registered design.

Scuito depicts an ornamental design for a combined flask and drinking glass holder. The flask and drinking glass are adjacent to one another and within a smooth-walled holder with a flat, oval base and smooth, plain walls equal in height to the body portions of the flask and glass. Both designs incorporate threaded portions on the receptacles' extremities, presumably to facilitate capping. The overall design disclosed by Scuito, however, is asymmetrical in that the necks of the adjacent receptacles are of different heights.

The final reference in the prior art, the Redken article, illustrates the type of bottle cap used by Carlson in his bottle design, and demonstrates the cap's existence in the art prior to the date of Carlson's invention.

II

Upon reexamination, the examiner rejected Carlson's argument that the Geschmacksmuster should not qualify as prior art under section 102(a), and found that the design protected by Des. 289,855 would have been obvious under section 103. Because the Geschmacksmuster was issued less than twelve months prior to the date of Carlson's application, 35 U.S.C. Section 102(b) (1988) is inapplicable.

On appeal, the Board cited as its guide and authority *In re Talbott*, 443 F.2d 1397, 170 USPQ 281 (CCPA 1971) (German Geschmacksmuster constitutes a

"foreign patent" for purposes of 35 U.S.C. Section 102(d) (1988)), and *In re Monks*, 588 F.2d 308, 200 USPQ 129 (CCPA 1978) (no reason to distinguish between sections 102(a) and 102(d) in determining what constitutes a "foreign patent"). Based on those cases, the Board concluded that a Geschmacksmuster constitutes a patent for purposes of section 102(a). Consequently, the Board held that the Geschmacksmuster was pertinent prior art, and affirmed the examiner's conclusion that Des. 289,855 would have been obvious over the Geschmacksmuster in light of Scuito and the Redken article. Carlson timely appealed the Board's decision to this court.

III

Interpretation of statutory terms is a question of law which this court reviews *de novo*. *Midwest Plastic Fabricators, Inc. v. Underwriters Labs. Inc.*, 906 F.2d 1568, 1572, 15 USPQ2d 1359, 1362 (Fed. Cir. 1990); *Chaparral Steel Co. v. United States*, 901 F.2d 1097, 1100 (Fed. Cir. 1990).

Assuming no other bar to patentability, a person is entitled to a patent under U.S. law unless the same invention was patented by another person in a foreign country prior to the invention thereof by the U.S. applicant. 35 U.S.C. Section 102(a) (1988). The potential bar thus created by the existence of a patent issued in a foreign country gives rise to the availability of such a foreign patent as a prior art reference for the purpose of determining the validity of the claims in a U.S. patent or pending patent application. *See *1210 Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 695, 218 USPQ 865, 867 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043, 224 USPQ 520 (1984); *In re Zimmer*, 387 F.2d 990, 991, 156 USPQ 252, 253 (CCPA 1968).

A further bar to patentability arises if an applicant for a U.S. patent has been granted a patent in a foreign country on the same invention more than twelve months prior to the date the patent application is filed in the United States. 35 U.S.C. Section 102(d) (1988).

The precise words of section 102 read, in pertinent part:

A person shall be entitled to a patent unless--

(a) the invention was . . . patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or . . .

(d) the invention was first patented . . . by the applicant . . . in a foreign country prior to the date of the application for patent in this country on an application for patent . . . filed more than twelve months before the filing of the application in the United States. . . .

35 U.S.C. Section 102 (1988). With respect to design patents, however, Congress has provided that the time bar in section 102(d) is six months. 35 U.S.C. Section 172 (1988).

In *In re Talbott*, our predecessor court decided, as a matter of first impression, that a design protected by a Geschmacksmuster qualifies under section 102(d) as an invention patented in a foreign country for purposes of applying the statutory time bar against an application for a U.S. design patent covering the same subject matter. 443 F.2d at 1398-99, 170 USPQ at 282. The court rejected the argument that a Geschmacksmuster should not be deemed to fall within section 102(d) because the copyright nature of the rights protected by the Geschmacksmuster is substantially different from the rights inherent in a U.S. design patent. *Id.*, 170 USPQ at 281-82. This rejection was based on reasoning adopted in the case by the Board, which in turn relied upon the opinion of Examiner-in-Chief P.J. Federico in *Ex Parte Weiss*, 159 USPQ 122 (Pat. Off. Bd. App. 1967). With regard to construing "patented . . . in a foreign country" under section 102(d), Federico concluded that the rights and privileges attaching to the protection granted by foreign governments need not be coextensive with the exclusive rights granted under U.S. law, so long as the foreign rights granted are both substantial and exclusive in nature. *Id.* at 123-24. *Cf. In re Howarth*, 654 F.2d 103, 105 n.3, 210 USPQ 689, 690 n.3 (CCPA 1981) ("Not every foreign document labelled a 'patent' is a patent within the meaning of 35 U.S.C. Section 102(a) or (b).") (citing *In re Ekenstam*, 256 F.2d 321, 323, 118 USPQ 349, 351 (CCPA 1958))). Because a Geschmacksmuster conveys substantial and exclusive rights in the design, the Board in *Weiss* held that a Geschmacksmuster qualifies as prior art under section 102(d). 159 USPQ at 124. The court in *Talbott* expressly "adopt [ed] as our own, the reasoning set out so completely in [*Weiss*]." 443 F.2d at 1399, 170 USPQ at 242.

Our predecessor court also had occasion to consider whether the phrase "patented . . . in . . . a foreign country," as used in section 102(a), should have a different meaning from the same language used in section 102(d). The issue arose in *In re Monks*, a case

concerned with the bar to patentability under section 102(d). The Solicitor contended that the date upon which an invention is patented in a foreign country should differ for the purposes of section 102(a) versus section 102(d). At stake was whether the British patent date should be the date the patent finally issued, or an earlier date when the contents of the patent were initially published. 588 F.2d at 309, 200 USPQ at 130. Emphasizing that section 102(d) relates to foreign patents of the U.S. applicant (of which the U.S. applicant must necessarily be aware), whereas section 102(a) relates to foreign patents of others, the Solicitor argued that the foreign patent date under section 102(d) could properly precede the like date under section 102(a). The court refused to draw such a distinction:

First, there is no basis in the [Patent] Act or its legislative history for making such a distinction. The statute uses the identical phrase, "patented . . . in a foreign country," in each of these sections. Nowhere in the legislative history is there the slightest suggestion that these same phrases be interpreted differently.

Id. at 310, 200 USPQ at 131. Although this observation was made with respect to the date on which a foreign patent becomes "patented" within the meaning of section 102(d), the language applies equally as well to the present issue of whether a distinction should be drawn between subsections (a) and (d) of section 102 when considering whether a Geschmacksmuster is a foreign patent citable as prior art in a section 103 analysis.

IV

Whether a Geschmacksmuster is a foreign patent under section 102(a) is a question of *1211 first impression. That a Geschmacksmuster qualifies as a patent for section 102(d) purposes is settled law, embraced by the Solicitor, unchallenged by Carlson, and a proposition with which we do not disagree.

Notwithstanding the holding in *Talbott* and the strong conclusion in *Monks* that the test for determining what constitutes a foreign patent should not differ between subsections (a) and (d) of section 102, Carlson invites this court to deny Geschmacksmuster the status of patents under section 102(a).

Carlson first points to language in *Talbott* that recognizes the different situations addressed by subsections (a) and (d) of section 102 and states that the policy considerations underlying the different

subsections, "while overlapping to some extent, are not necessarily identical." 443 F.2d at 1399, 170 USPQ at 282. Carlson claims to base his argument on this premise.

We do not dispute that section 102(a), relating to potential prior art in the form of patents issued in a foreign country and held by persons other than the U.S. patent applicant, serves a purpose akin to, but different from, section 102(d), which specifies the time within which the owner of a foreign patent must apply for a U.S. patent on the same invention. That distinction, however, does not suggest that a Geschmacksmuster lacks the necessary credentials to qualify as a patent under section 102(a).

Nevertheless, Carlson asserts that the correct interpretation of section 102(a) requires that a foreign patent only serve as prior art if it discloses its invention in a readily-accessible fashion. In essence, Carlson argues that the embodiment of foreign protection must take a form that fully discloses the nature of the protected design in a medium of communication capable of being widely disseminated. Because this requirement is clearly not satisfied by depositing a model in a city courthouse in a foreign land, the embodiment cannot constitute an invention patented in a foreign country for purposes of section 102(a) because it is incapable of providing detailed instruction to a large enough number of persons remote from the location of deposit. Moreover, Carlson argues, since the Bundesanzeiger entry does not explicitly refer to dual-compartment containers, it cannot provide notice of the existence of the pertinent model of the Geschmacksmuster to a designer of such containers.

Carlson correctly surmises that section 102(a) contains a requirement that a foreign patent be disclosed in order to qualify as prior art under section 102(a). The requirement, however, is only that the patent be "available to the public." *In re Ekenstam*, 256 F.2d 321, 324, 325, 118 USPQ 349, 351, 353 (CCPA 1958) (citing *Brooks v. Norcross*, 4 F. Cas. 294, 296 (C.C.D. Mass. 1851) (No. 1,957) (inventions protected by secret/"private" patents do not qualify as "patented abroad" under U.S. law)).

Because the description of the Geschmacksmuster in the Bundesanzeiger does not specifically refer to a multicompartment container, Carlson would have us deem the designs incorporated therein outside of the relevant field of prior art. His argument, however, represents an overly narrow view of the prior art germane to his invention. See, e.g., *In re Deminski*,

796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986) (reference must be "within the field of the inventor's endeavor," or if not, "reasonably pertinent to the particular problem with which the inventor was involved." (quoting *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979))).

The Bundesanzeiger entry regarding the Geschmacksmuster at issue in this appeal clearly refers to a single package incorporating multiple plastic bottles, thereby alerting the public to potentially relevant designs, and directs the notified reader to proceed to Coburg to obtain the actual design. Once in Coburg, the protected design is completely "available to the public" through the certified copy of the Geschmacksmuster.

We recognize that Geschmacksmuster on display for public view in remote cities in a far-away land may create a burden of discovery for one without the time, desire, or resources to journey there in person or by agent to observe that which was registered and protected under German law. Such a burden, however, is by law imposed upon the hypothetical person of ordinary skill in the art who is charged with knowledge of all the contents of the relevant prior art. *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1454, 223 USPQ 603, 614 (Fed. Cir. 1984); see also *In re Hall*, 781 F.2d 897, 899-900, 228 USPQ 453, 456 (Fed. Cir. 1986) (doctoral dissertation, catalogued and available at Freiburg University, Germany, provides sufficient "public accessibility" for a printed publication under section 102(b)).

Moreover, actual knowledge of the Geschmacksmuster is not required for the disclosure to be considered prior art. To determine patentability, a hypothetical person is presumed to know all the pertinent prior art, whether or not the applicant is actually aware of its existence. *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); see also *In re Howarth*, 654 F.2d 103, 106, 210 USPQ 689, 692 (CCPA 1981) ("Section 102 has as one objective that only the first inventor obtain a patent. . . . Foreign 'patents' and foreign 'printed publications' preclude the grant of a patent whether or not the information is commonly known. Under [section] 102 a conclusive presumption of knowledge of such prior art is, in effect, a statutorily required fiction.").

[1] In conclusion, we hold that because the Geschmacksmuster fully discloses the design upon which German law conferred the exclusive rights attendant to the registration, the Geschmacksmuster

qualifies as a foreign *1212 patent for purposes of section 102(a), and therefore constitutes prior art for use in the obviousness analysis under section 103. *In re Zimmer*, 387 F.2d 990, 991, 156 USPQ 252, 253 (CCPA 1968). Cf. *In re Mulder*, 716 F.2d 1542, 1545, 219 USPQ 189, 193 (Fed. Cir. 1983) ("[P]rinted publication . . . is prior art under [section] 102(a), . . . , and thus also 'prior art' under [section] 103.").

V

Whether an invention would have been obvious is a conclusion of law based upon the factual underpinnings stated in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966). Thus, this court reviews an obviousness determination by the Board *de novo*, while reviewing the factual findings underlying the obviousness determination for clear error. *In re Woodruff*, 919 F.2d 1575, 1577, 16 USPQ2d 1934, 1935 (Fed. Cir. 1990).

Carlson argues that even if the Geschmacksmuster is considered as prior art, Des. 289,855 would nevertheless not have been obvious in light of the Geschmacksmuster, Scuito, and the Redken article. Carlson relies on the fact that the Geschmacksmuster and Scuito, the only references pertinent to the design of a dual compartment bottle, emphasize asymmetry, whereas his dual-compartment bottle design is symmetrical around a plane vertically bisecting the bottle midway between the bottle caps. Citing *In re Cho*, 813 F.2d 378, 1 USPQ2d 1662 (Fed. Cir. 1987), Carlson concludes that since none of the references teach a symmetrical design for a dual compartment bottle, Des. 289,855 must have been nonobvious. We disagree.

In re Cho, concerned with the ornamental design of a bottle cap, contains a succinct statement of when a design patent application should be rejected under section 103:

To support [such] a rejection . . . , the teachings of references must be such as to have suggested the overall appearance of the claimed design. . . . Thus, if the combined teachings suggest only components of the claimed design but not its overall appearance, a rejection under section 103 is inappropriate.

Id. at 382, 1 USPQ2d at 1663-64 (citations omitted). This language describes the situation where each individual element of the design is disclosed in the pertinent prior art, but those elements have not been

combined. In the present case, however, a person of ordinary skill in the art, or stated otherwise, "a designer of ordinary capability who designs articles of the type presented," *id.*, 1 USPQ2d at 1663 (citing *In re Nalbandian*, 661 F.2d 1214, 1216, 211 USPQ 782, 784 (CCPA 1981)), need not necessarily study the prior art in order to understand the potential use of a symmetrical design.

[2] In a field of art such as this, where products are deliberately designed as asymmetrical in order to create distinctive, memorable images, it would have been obvious to one of ordinary skill in the art to create a "normal" or symmetrical orientation for a design. Cf. *In re Wilson*, 345 F.2d 1018, 1020, 145 USPQ 558, 559 (CCPA 1965) (pleasing symmetry is not nonobvious where it represents no more than obvious symmetry with convenience in mind). Indeed, knowledge of symmetry is one reason why more complex designs are developed -- the *expected*

design configuration is one of symmetry. In any event, Scuito and the Geschmacksmuster manifest "the overall appearance of the claimed design," since it would have been obvious to bury the Geschmacksmuster's line of demarcation between the vessels and create the smooth, uniform surface found in Scuito. The difference in the design of a smooth-walled dual compartment container and one with a visible line of demarcation is not a difference such as would establish the nonobviousness of the design as a whole under *In re Cho*. Because the relevant prior art renders Carlson's design obvious under section 103, the judgment of the Board is *AFFIRMED*.

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Appendix 14: *In re Dembiczak*, 175 F.3d 994, 50 U.S.P.Q.2d 1614 (Fed. Cir. 1999)

▷

In re Dembiczak

U.S. Court of Appeals Federal Circuit

No. 98-1498

Decided April 28, 1999

United States Patents Quarterly Headnotes

PATENTS

[1] Patentability/Validity -- Obviousness -- Combining references (Section 115.0905)

Decision rejecting claims in utility application as obvious over combination of prior art references must be reversed, since obviousness analysis in decision is limited to discussion of ways that multiple references can be combined to read on claimed invention, but does not particularly identify any suggestion, teaching, or motivation to combine references, and does not include specific or inferential findings concerning identification of relevant art, level of ordinary skill in art, nature of problem to be solved, or any other factual findings that might support proper obviousness analysis.

PATENTS

[2] Patentability/Validity -- Anticipation -- Double patenting (Section 115.0708)

Obviousness-type double patenting may be found between design and utility patents in rare cases, but such rejection is appropriate only if claims of two patents cross-read, meaning that subject matter of claims of patent sought to be invalidated would have been obvious from subject matter of claims of other patent, and vice-versa.

PATENTS

[3] Patentability/Validity -- Anticipation -- Double patenting (Section 115.0708)

Applicants' design patents for bag with jack-o'-lantern face would not have been obvious variants of their pending utility claims directed to trash bag decorated to resemble Halloween pumpkin when filled with trash or leaves, since textual description of "facial indicia" on bag found in claims of utility patent application cannot constitute design reference that is "basically the same as" specific designs claimed in applicants' patentably distinct design patents.

***1614** Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Application of Anita Dembiczak and Benson Zinbarg for utility patent (application serial no. 08/427,732). From decision sustaining rejections of claims in application, applicants appeal. Reversed.

David P. Gordon and Thomas A. Gallagher, Stamford, Conn., for appellants.

John M. Whealan, associate solicitor, Albin F. Drost, acting solicitor, and David R. Nicholson, associate solicitor, Office of the Solicitor, Arlington, Va., for appellee.

Before Mayer, chief judge, and Michel and Clevenger, circuit judges.

Clevenger, J.

Anita Dembiczak and Benson Zinbarg appeal the rejection, upheld by the Board of Patent Appeals and Interferences, of all pending claims in their Application No. 08/427,732. *See Ex Parte Dembiczak*, No. 96-2648, slip op. at 43 (May 14, 1998). Because the Board erred in sustaining rejections of the pending claims as obvious under 35 U.S.C. Section 103(a) (Supp. 1998), and for obviousness-type double patenting, we reverse.

*1615 I

The invention at issue in this case is, generally speaking, a large trash bag made of orange plastic and decorated with lines and facial features, allowing the bag, when filled with trash or leaves, to resemble a Halloween-style pumpkin, or jack-o'-lantern. As the inventors, Anita Dembiczak and Benson Zinbarg (collectively, "Dembiczak") note, the invention solves the long-standing problem of unsightly trash bags placed on the curbs of America, and, by fortuitous happenstance, allows users to express their whimsical or festive nature while properly storing garbage, leaves, or other household debris awaiting collection. Embodiments of the invention--sold under a variety of names, including Giant Stuff-A-Pumpkin(trade mark), Funkins, Jack Sak(trade mark), and Bag-O-Fun(trade mark)--have undisputedly been well-received by consumers, who bought more than seven million units in 1990 alone. Indeed, in 1990, the popularity of the pumpkin bags engendered a rash of thefts around Houston, Texas, leading some owners to resort to preventative measures, such as greasing the bags with

petroleum jelly and tying them to trees. See R. Pillar, "Halloween Hopes Die on the Vine," *Hous. Chron.*, Oct. 19, 1990, at 13A.

The road to profits has proved much easier than the path to patentability, however. In July 1989, Dembiczak filed a utility patent application generally directed to the pumpkin bags. In a February 1992 appeal, the Board of Patent Appeals and Interferences ("the Board") reversed the Examiner's rejection, but entered new grounds for rejection. Dembiczak elected to continue prosecution, filing a continuation application to address the new grounds for rejection. Thereafter, the invention made a second appearance before the Board, in April 1993, when the Board both sustained the Examiner's rejection and again entered new grounds for rejection. Again, a continuation application was filed (the instant application). And again the Examiner's rejection was appealed to the Board, which sustained the rejection in a May 14, 1998, decision. See *Dembiczak*, slip op. at 43.

A

The patent application at issue includes claims directed to various embodiments of the pumpkin bag. Claims 37, 49, 51, 52, 58 through 64, 66 through 69, and 72 through 81 are at issue in this appeal. Though the claims vary, independent claim 74 is perhaps most representative:

74.A decorative bag for use by a user with trash filling material, the bag simulating the general outer appearance of an outer surface of a pumpkin having facial indicia thereon, comprising:

a flexible waterproof plastic trash or leaf bag having

an outer surface which is premanufactured orange in color for the user to simulate the general appearance of the outer skin of a pumpkin, and having

facial indicia including at least two of an eye, a nose and a mouth on the orange color outer surface for forming a face pattern on said orange color outer surface to simulate the general outer appearance of a decorative pumpkin with a face thereon,

said trash or leaf bag having first and second opposite ends, at least said second end having an opening extending substantially across the full width of said trash or leaf bag for receiving the trash filling material,

wherein when said trash or leaf bag is filled with trash

filling material and closed, said trash or leaf bag takes the form and general appearance of a pumpkin with a face thereon.

All of the independent claims on appeal, namely 37, 52, 72, and 74, contain limitations that the bag must be "premanufactured orange in color," have "facial indicia," have openings suitable for filling with trash material, and that when filled, the bag must have a generally rounded appearance, like a pumpkin. Independent claims 37, 52, and 72 add the limitation that the bag's height must at least 36 inches. Claim 72 requires that the bag be made of a "weatherproof material," and claim 74, as shown above, requires that the bag be "waterproof." Claim 52 recites a "method of assembling" a bag with the general characteristics of apparatus claim 37.

B

The prior art cited by the Board includes:

(1) pages 24-25 of a book entitled "A Handbook for Teachers of Elementary Art," by Holiday Art Activities ("Holiday"), describing how to teach children to make a "Crepe Paper Jack-O-Lantern" out of a strip of orange crepe paper, construction paper cut-outs in the shape of facial features, and "wadded newspapers" as filling;

(2) page 73 of a book entitled "The Everything Book for Teachers of Young Children," *1616 by Martha Shapiro and Valerie Indenbaum ("Shapiro"), describing a method of making a "paper bag pumpkin" by stuffing a bag with newspapers, painting it orange, and then painting on facial features with black paint;

(3) U.S. Patent No. 3,349,991 to Leonard Kessler, entitled "Flexible Container" ("Kessler"), describing a bag apparatus wherein the bag closure is accomplished by the use of folds or gussets in the bag material;

(4) U.S. Patent No. Des. 310,023, issued August 21, 1990 to Dembiczak ("Dembiczak '023"), a design patent depicting a bag with a jack-o'-lantern face;

(5) U.S. Patent No. Des. 317,254, issued June 4, 1991 to Dembiczak ("Dembiczak '254"), a design patent depicting a bag with a jack-o'-lantern face; and,

(6) Prior art "conventional" plastic lawn or trash bags ("the conventional trash bags").

Using this art, the Board affirmed the Examiner's final rejection of all the independent claims (37, 52,

72, 74) under 35 U.S.C. Section 103, holding that they would have been obvious in light of the conventional trash bags in view of the Holiday and Shapiro references. The Board determined that, in its view of the prior art, "the only difference between the invention presently defined in the independent claims on appeal and the orange plastic trash bags of the prior art and the use of such bags resides in the application of the facial indicia to the outer surface of the bag." *Dembiczak*, slip op. at 18. The Board further held that the missing facial indicia elements were provided by the Holiday and Shapiro references' description of painting jack-o'-lantern faces on paper bags. *See id.* at 18-19. Dependent claims 49 and 79, which include a "gussets" limitation, were considered obvious under similar reasoning, except that the references cited against them included Kessler. *See id.* at 7.

The Board also affirmed the Examiner's obviousness-type double patenting rejection of all the independent claims in light of the two *Dembiczak* design patents (023 and 254) and Holiday. *See id.* at 12. The Board held that the design patents depict a generally rounded bag with jack-o'-lantern facial indicia, and that the Holiday reference supplies the missing limitations, such as the "thin, flexible material" of manufacture, the orange color, the initially-open upper end, and the trash filling material. The Board also stated that the various limitations of the dependent claims--e.g., color, the inclusion of leaves as stuffing, and the dimensions--would all be obvious variations of the depictions in the *Dembiczak* design patents. *See id.* at 8-9. In addition, using a two-way test for obviousness-type double patenting, the Board held that the claims of the *Dembiczak* design patents "do not exclude" the additional structural limitations of the pending utility claims, and thus the design patents were merely obvious variations of the subject matter disclosed in the utility claims. *See id.* at 11. The Board further upheld, on similar grounds and with the inclusion of the Kessler reference, the obviousness-type double patenting rejection of dependent claim 49. *See id.* at 12.

This appeal followed, vesting this court with jurisdiction pursuant to 28 U.S.C. Section 1295(a)(4)(A) (1994).

II

A claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

skill in the art." 35 U.S.C. Section 103(a) (Supp. 1998) ; *see Graham v. John Deere Co.*, 383 U.S. 1, 14, 148 USPQ 459, 465 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *See Graham*, 383 U.S. at 17-18, 148 USPQ at 467 ; *Miles Labs, Inc., Inc. v. Shandon Inc.*, 997 F.2d 870, 877, 27 USPQ2d 1123, 1128 (Fed. Cir. 1993). We therefore review the ultimate determination of obviousness without deference to the Board, while examining any factual findings for clear error. *See, e.g., In re Zurko*, 142 F.3d 1447, 1459, 46 USPQ2d 1691, 1700 (Fed. Cir.) (en banc), cert. granted, 119 S. Ct. 401 (1998).

A

Our analysis begins in the text of section 103 quoted above, with the phrase "at the time the invention was made." For it is this phrase that guards against entry into the "tempting but forbidden zone of hindsight," *see Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 873, 228 USPQ 90, 98 (Fed. Cir. 1985), *overruled on other grounds by Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 46 USPQ2d 1097 (Fed. Cir. 1998), *1617 when analyzing the patentability of claims pursuant to that section. Measuring a claimed invention against the standard established by section 103 requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed. Cir. 1983). Close adherence to this methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *Id.*

Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. *See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998) (describing "teaching or suggestion or motivation [to combine]" as

an "essential evidentiary component of an obviousness holding"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("the Board must identify specifically . . . the reasons one of ordinary skill in the art would have been motivated to select the references and combine them"); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]"); *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (evidence of teaching or suggestion "essential" to avoid hindsight); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297, 227 USPQ 657, 667 (Fed. Cir. 1985) (district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination"). See also *Graham*, 383 U.S. at 18, 148 USPQ at 467 ("strict observance" of factual predicates to obviousness conclusion required). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight. See, e.g., *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed. Cir. 1985) ("The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."). In this case, the Board fell into the hindsight trap.

We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved, see *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996), *Para-Ordinance Mfg. v. SGS Imports Intern., Inc.*, 73 F.3d 1085, 1088, 37 USPQ2d 1237, 1240 (Fed. Cir. 1995), although "the suggestion more often comes from the teachings of the pertinent references," *Rouffet*, 149 F.3d at 1355, 47 USPQ2d at 1456. The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular. See, e.g., *C.R. Bard*, 157 F.3d at 1352, 48 USPQ2d at 1232. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." E.g., *McElmurry v. Arkansas Power & Light Co.*, 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed. Cir. 1993) ("Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of material fact."); *In re*

Sichert, 566 F.2d 1154, 1164, 196 USPQ 209, 217 (CCPA 1977) ("The examiner's conclusory statement that the specification does not teach the best mode of using the invention is unaccompanied by evidence or reasoning and is entirely inadequate to support the rejection."). In addition to demonstrating the propriety of an obviousness analysis, particular factual findings regarding the suggestion, teaching, or motivation to combine serve a number of important purposes, including: (1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of review on appeal. Here, however, the Board did not make particular findings regarding the locus of the suggestion, teaching, or motivation to combine the prior art references.

[1] All the obviousness rejections affirmed by the Board resulted from a combination of prior art references, e.g., the conventional trash or yard bags, and the Holiday and Shapiro publications teaching the construction of decorated paper bags. See *Dembiczak*, slip op. at 6-7. To justify this combination, the Board simply stated that "the Holiday and Shapiro references would have *1618 suggested the application of . . . facial indicia to the prior art plastic trash bags." *Id.* at 18-19. However, rather than pointing to specific information in Holiday or Shapiro that suggest the combination with the conventional bags, the Board instead described in detail the similarities between the Holiday and Shapiro references and the claimed invention, noting that one reference or the other--in combination with each other and the conventional trash bags--described all of the limitations of the pending claims. See *id.* at 18-28. Nowhere does the Board particularly identify any suggestion, teaching, or motivation to combine the children's art references (Holiday and Shapiro) with the conventional trash or lawn bag references, nor does the Board make specific--or even inferential--findings concerning the identification of the relevant art, the level of ordinary skill in the art, the nature of the problem to be solved, or any other factual findings that might serve to support a proper obviousness analysis. See, e.g., *Pro-Mold & Tool*, 75 F.3d at 1573, 37 USPQ2d at 1630.

To the contrary, the obviousness analysis in the Board's decision is limited to a discussion of the ways that the multiple prior art references can be combined to read on the claimed invention. For example, the Board finds that the Holiday bag reference depicts a

"premanufactured orange" bag material, *see Dembiczak*, slip op. at 21, finds that Shapiro teaches the use of paper bags in various sizes, including "large", *see id.* at 22-23, and concludes that the substitution of orange plastic for the crepe paper of Holiday and the paper bags of Shapiro would be an obvious design choice, *see id.* at 24. Yet this reference-by-reference, limitation-by-limitation analysis fails to demonstrate how the Holiday and Shapiro references teach or suggest their combination with the conventional trash or lawn bags to yield the claimed invention. *See Rouffet*, 149 F.3d at 1357, 47 USPQ2d at 1459 (noting Board's failure to explain, when analyzing the prior art, "what specific understanding or technical principle . . . would have suggested the combination"). Because we do not discern any finding by the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board's conclusion of obviousness, as a matter of law, cannot stand. *See C.R. Bard*, 157 F.3d at 1352, 48 USPQ2d at 1232 ; *Rouffet*, 149 F.3d at 1359, 47 USPQ2d at 1459 ; *Fritch*, 972 F.2d at 1265, 23 USPQ2d at 1783 ; *Fine*, 837 F.2d at 1075, 5 USPQ2d at 1600 ; *Ashland Oil*, 776 F.2d at 297, 227 USPQ at 667 .

B

The Commissioner of Patents and Trademarks ("Commissioner") attempts to justify the Board's decision on grounds different from that relied upon by the Board, arguing that one of ordinary skill in the art would have been motivated to combine the references. Of course, in order to do so, the Commissioner must do what the Board did not do below: make specific findings of fact regarding the level of skill in the art ("a designer and manufacturer of trash and leaf bags, particularly one specializing in the ornamental and graphic design of such bags"), *Resp't Br.* at 14, the relationship between the fields of conventional trash bags and children's crafts, respectively ("[t]he artisan would also have been well aware of the ancillary, corollary, and atypical uses of 'trash' bags such as their application in hobby and art projects"), *Resp't Br.* at 15, and the particular features of the prior art references that would motivate one of ordinary skill in a particular art to select elements disclosed in references from a wholly different field ("a designer and manufacturer of trash and leaf bags would have recognized the paper bag in Shapiro to be a trash bag and therefore would have been motivated to combine it with the admitted prior art plastic trash and leaf bags to arrive at the claimed invention"), *Resp't Br.* at 15. The Commissioner also appears to cite additional

references in support of his obviousness analysis, noting that at least two design patents (in the record but not cited against the presently pending claims) teach the placement of "graphical information, including text, designs, and even facial indicia, to colored bags." *Resp't Br.* at 16. This new analysis, apparently cut from whole cloth in view of appeal, does little more than highlight the shortcomings of the decision below, and we decline to consider it. *See, e.g., In re Robertson*, 169 F.3d 743, , 49 USPQ2d 1949, 1951 (Fed. Cir. 1999) ("We decline to consider [the Commissioner's] newly-minted theory as an alternative ground for upholding the agency's decision."); *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed. Cir. 1995); *In re Hounsfield*, 699 F.2d 1320, 1324, 216 USPQ 1045, 1049 (Fed. Cir. 1983) (rejecting an "attempt [] by the Commissioner to apply a new rationale to support the rejection."); *see also* 35 U.S.C. Section 144 (1994) (an appeal to the Federal Circuit "is taken on the record before The Patent and Trademark Office"). Because the Board has not established a *prima facie* case of obviousness, *see In re Bell*, 991 F.2d 781, *1619 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) ("The PTO bears the burden of establishing a case of *prima facie* obviousness."), we therefore reverse the obviousness rejections, and have no need to address the parties' arguments with respect to secondary factors.

III

Dembiczak also asks this court to reverse the Board's rejection of the pending claims for obviousness-type double patenting, which is a judicially- created doctrine that seeks to prevent the applicant from expanding the grant of the patent right beyond the limits prescribed in Title 35. *See, e.g., In re Braat*, 937 F.2d 589, 592, 19 USPQ2d 1289, 1291-92 (Fed. Cir. 1991); *In re Longi*, 759 F.2d 887, 892, 225 USPQ 645, 648 (Fed. Cir. 1985). *See also* 35 U.S.C. Section 154(a)(2) (Supp. 1998) (discussing patent term). The doctrine prohibits claims in a second patent which define "merely an obvious variation" of an invention claimed by the same inventor in an earlier patent. *Braat*, 937 F.2d at 592, 19 USPQ2d at 1292 (quoting *In re Vogel*, 422 F.2d 438, 441, 164 USPQ 619, 622 (CCPA 1970)). Thus, unless a claim sought in the later patent is patentably distinct from the claims in an earlier patent, the claim must be rejected. *See In re Goodman*, 11 F.3d 1046, 1052, 29 USPQ2d 2010, 2015 (Fed. Cir. 1993); *Vogel*, 422 F.2d at 441, 164 USPQ at 622 . This question is one of law, which we review *de novo*. *See Goodman*, 11 F.3d at 1052, 29 USPQ2d at 2015 ; *Texas Instruments Inc. v. United*

States Int'l Trade Comm'n, 988 F.2d 1165, 1179, 26 USPQ2d 1018, 1029 (Fed. Cir. 1993).

A

[2] The law provides that, in some very rare cases, obvious-type double patenting may be found between design and utility patents. See *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 939-40, 220 USPQ 481, 487 (Fed. Cir. 1983) (noting that, while theoretically possible, "[d]ouble patenting is rare in the context of utility versus design patents"); *In re Thorington*, 418 F.2d 528, 536-37, 163 USPQ 644, 650 (CCPA 1969) (Double patenting between a design and utility patent is possible "if the features producing the novel aesthetic effect of a design patent or application are the same as those recited in the claims of a utility patent or application as producing a novel structure."); *In re Phelan*, 205 F.2d 183, 98 USPQ 156 (CCPA 1953); *In re Barber*, 81 F.2d 231, 28 USPQ 187 (CCPA 1936); *In re Hargraves*, 53 F.2d 900, 11 USPQ 240 (CCPA 1931). In these cases, a "two-way" test is applicable. See *Carman*, 724 F.2d at 940, 220 USPQ at 487. Under this test, the obviousness-type double patenting rejection is appropriate only if the claims of the two patents cross-read, meaning that "the test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the other patent, and vice versa." *Id.*, 220 USPQ at 487. See also *Braat*, 937 F.2d at 593, 19 USPQ2d at 1292 (explaining two-way test).

B

In making its double patenting rejection, the Board concluded that all but one of the pending claims of Dembiczak's utility application would have been merely an obvious variation of the claims of the earlier-issued design patents--the Dembiczak '023 and '254 references--in light of the Holiday reference. The remaining claim, dependent claim 49, was judged obvious in light of the combination of the Dembiczak design patents, Holiday, and the Kessler reference.

[3] Acknowledging that the two-way test was required by *Carman*, 724 F.2d at 940, 220 USPQ at 487, the Board concluded that "the design claimed in each of appellants' design patents does not exclude the features pertaining to the construction and color of the bag, the use of a plastic material for making the bag, the size or thickness of the bag . . . or the use of various types of filling material The particular details of the facial indicia would have

been a matter of design choice as evidenced by the Holiday handbook," and that therefore, in view of Holiday, the claims of the design patents were obvious variants of the pending utility patent claims. See *Dembiczak*, slip op. at 11. We disagree. In order for a design to be unpatentable because of obviousness, there must first be a basic design reference in the prior art, the design characteristics of which are "basically the same as the claimed design." *In re Borden*, 90 F.3d 1570, 1574, 39 USPQ2d 1524, 1526 (Fed. Cir. 1996); *In re Rosen*, 673 F.2d 388, 391, 213 USPQ 347, 350 (CCPA 1982). The phrase "having facial indicia thereon" found in the claims of the pending utility application is not a design reference that is "basically the same as the claimed design." *Borden*, 90 F.3d at 1574, 39 USPQ2d at 1526. In fact, it describes precious little with respect to design characteristics. *1620 The Board's suggestion that the design details were simply "a matter of design choice" evinces a misapprehension of the subject matter of design patents. E.g., *Carman*, 724 F.2d at 939 n.13, 220 USPQ at 486 n.13 ("Utility patents afford protection for the mechanical structure and function of an invention whereas design patent protection concerns the ornamental or aesthetic features of a design.") Indeed, we note that the two design patents at issue here--the Dembiczak '023 and '254 patents--were considered nonobvious over each other, and were even the subject of a restriction requirement. See 35 U.S.C. Section 121 (1994) ("If two or more independent and distinct inventions are claimed in one application, the Commissioner may require the application to be restricted to one of the inventions."); 37 C.F.R. Section 1.142. The position adopted by the Board--that a textual description of facial indicia found in the claims of the utility patent application makes obvious the specific designs claimed in the (patentably distinct) Dembiczak design patents--would presumably render obvious, or even anticipate, all design patents where a face was depicted on a bag. But this, of course, is not the law; the textual description cannot be said to be a reference "basically the same as the claimed design," of the design patents at issue here. *Borden*, 90 F.3d at 1574, 39 USPQ2d at 1526 (internal quotation marks omitted). The Board's conclusion of obviousness is incorrect.

Because we find that the Board erred in concluding that the design patents were obvious variants of the pending utility claims, we need not address the other prong of the two-way double patenting test--whether the pending utility claims are obvious variations of the

subject matter claimed in the design patents. *See Carman*, 724 F.2d at 939, 220 USPQ at 487 (both prongs of the two-way test required for obviousness-type double patenting). The double patenting rejections are reversed.

IV

Because there is no evidence in the record of a suggestion, teaching, or motivation to combine the prior art references asserted against the pending claims, the obviousness rejections are reversed. In

addition, because the Board misapprehended the test for obviousness-type double patenting, and because the pending utility claims do not render obvious the design patents, the double patenting rejections are also reversed.

REVERSED.

C.A.Fed.

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Appendix 15: *In re Gartside*, 203 F.3d 1305, 53 U.S.P.Q.2d 1769 (Fed. Cir. 2000).

▷

In re Gartside

U.S. Court of Appeals Federal Circuit

No. 99-1241

Decided February 15, 2000

United States Patents Quarterly Headnotes

JUDICIAL PRACTICE AND PROCEDURE

[1] Procedure -- Judicial review -- Standard of review -- Patents (Section 410.4607.09)

U.S. Court of Appeals for the Federal Circuit will apply "substantial evidence" standard of review, specified by Administrative Procedure Act in 5 U.S.C. Section 706(2)(E), to decision in interference finding claims in application to be unpatentable, since more deferential "arbitrary, capricious" standard in Section 706(2)(A) applies only if substantial evidence test is inapplicable, since Section 706(2)(E) applies to factfinding performed in case "reviewed on the record of an agency hearing provided by statute," since plain language of 35 U.S.C. Sections 7 and 144 indicates that Federal Circuit reviews decisions of Board of Patent Appeals and Interferences on such record, and since substantial evidence review is appropriate in view of plenary nature of record on appeal.

JUDICIAL PRACTICE AND PROCEDURE

[2] Procedure -- Judicial review -- Standard of review -- Patents (Section 410.4607.09)

Decision of Board of Patent Appeals and Interferences to resolve issues of patentability that were not placed in issue by parties during interference proceeding is reviewed for abuse of discretion, which occurs if decision is based on erroneous interpretation of law or clearly erroneous factfinding, or if decision is not supported by substantial evidence; board's factual determinations in obviousness analysis are also reviewed under "substantial evidence" standard.

PATENTS

[3] Practice and procedure in Patent and Trademark Office -- Board of Patent Appeals and Interferences -- Jurisdiction (Section 110.1103)

Practice and procedure in Patent and Trademark Office -- Interference -- Voluntary termination (Section 110.1705)

Board of Patent Appeals and Interferences was not divested of jurisdiction over interference proceeding by junior party's withdrawal, and board did not abuse

its discretion by deciding patentability of senior party's claims following that withdrawal, since, under 35 U.S.C. Section 135(a), once interference is properly declared, board should decide issues of priority and patentability fairly raised and fully developed during interference, since it is within Board's discretion to resolve patentability issues based on public interest, and since senior party was not prejudiced by resolution of patentability issues by board rather than by examiner.

PATENTS

[4] Patentability/Validity -- Obviousness -- Combining references (Section 115.0905)

Board of Patent Appeals and Interferences correctly determined that application claims directed to catalytic processes for "cracking" hydrocarbons were unpatentable under 35 U.S.C. Section 103, since substantial evidence supports board's conclusion that applicant's two prior patents contain all limitations set forth in application claims, and that one of ordinary skill in art would be motivated to apply teachings of first patent, which relates to arresting undesired cracking in thermal processes, to minimize undesired cracking in catalytic processes, and since that patent does not teach away from applying process disclosed in second patent to catalytic reactions.

PATENTS

[5] Patentability/Validity -- Obviousness -- Combining references (Section 115.0905)

Board of Patent Appeals and Interferences correctly determined that application claims directed to catalytic processes for "cracking" hydrocarbons were unpatentable under 35 U.S.C. Section 103, since substantial evidence supports board's finding that motivation to combine three prior art patents arose from teachings of patents themselves and nature of problem to be solved, namely, maximizing reaction conditions in cracking process by minimizing residence time; declaration submitted by applicant did not contain evidence of unexpected results, and thus did not weigh in favor of patentability, since process recited in declaration failed to reproduce separation and quenching steps of claimed process.

***1769** Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent interference no. 103,255 between junior party John M. Forgac (patent no. 5,043,058), and senior parties Robert J. Gartside and Richard C. Norton

(application serial no. 07/798,627). Senior parties appeal from board's finding that certain claims in their application are unpatentable for obviousness. Affirmed.

*1770 Alan B. Clement, of Heidman, Gibson & Costigan, New York, N.Y., for appellants.

Mark Nagumo, associate solicitor, Albin F. Drost, acting solicitor, John M. Whealan, acting deputy solicitor, and Nancy Moncys Isacson, associate solicitor, of the Office of the Solicitor, Arlington, Va., for appellee.

Before Lourie, Clevenger, and Rader, circuit judges.

Lourie, J.

Robert J. Gartside and Richard C. Norton (collectively "Gartside") appeal from the final decision of the Board of Patent Appeals and Interferences holding that claims 34, 35, and 37-47 of application Ser. No. 07/798,627 are unpatentable as obvious under 35 U.S.C. Section 103. *See Forgac v. Gartside*, Paper No. 72 (BPAI May 21, 1998). Because the Board's factual findings relating to its obviousness analysis are supported by substantial evidence, and because the Board did not err in concluding that the claims were unpatentable as obvious as a matter of law, we affirm.

BACKGROUND

A. The Invention

Gartside's application is directed to "cracking" processes, *i.e.*, processes that generate low molecular weight, purified hydrocarbons of desired molecular composition by breaking down impure, high molecular weight hydrocarbon feed oil. Cracking is accomplished by reacting impure feed oil with "solids," particulate matter that induces the breakdown of feed oil by either a thermal or catalytic reaction mechanism. *See* '627 application, J.A. at 63. The claims at issue are all directed to catalytic cracking processes. Independent claim 47 has been argued to us as being "representative" of claims 34, 35, 37-40, and 42-44 and reads as follows:

47. A catalytic process comprising the steps of:

catalytically cracking hydrocarbon feed oil in a reactor of a catalytic cracking unit in the presence of a cracking catalyst at a temperature ranging from 1100 to 1500 degrees F to produce a catalytically cracked

effluent stream of upgraded oil containing catalyst;

substantially separating said catalyst from said upgraded oil in a separator and a cyclone; and

quenching said upgraded oil downstream of said separator upstream of said cyclone with a quenching oil.

Id. at 51 (paragraphing added). Independent claim 41 is similarly "representative" of dependent claims 45 and 46 and reads as follows:

41. A catalytic process, comprising the steps of:

(a) delivering hot particulate catalytic cracking solids to a catalytic cracking reactor;

(b) delivering a hydrocarbon feed to said reactors;

(c) cracking said hydrocarbon feed in said reactor at a temperature of from 1100 to 1500 degrees F to produce a cracked product;

(d) separating said catalytic solids from the cracked product;

(e) Equenching said cracked product;

wherein the total residence time from step (a) through step (e) ranges from 0.1 to 0.6 seconds.

Id. at 49 (paragraphing added).

B. The Interference Proceeding

Gartside copied claims from Forgac's U.S. Patent 5,043,058, entitled "Quenching Downstream of an External Vapor Catalyst Separator," into the '627 application, attempting to provoke an interference. [FN1] On February 4, 1994, the Administrative Patent Judge ("APJ") declared the interference between Gartside's application and Forgac's patent. *See* Paper No. 17 at 1. The APJ designated Gartside as the "senior party" and Forgac as the "junior party" in the interference, because Gartside's application was accorded an effective filing date prior to *1771 March 26, 1990, the filing date of the application that issued as Forgac's patent. *See id.* at 2-3. The APJ also determined that one count encompassed all of the interfering subject matter, [FN2] *i.e.*, claims 34-47 of the application and claims 1, 2, and 13 of the patent, and that that count corresponded exactly to claim 47 of the application. *See id.* at 3-4.

On September 12, 1995, the APJ issued an order addressing the parties' motions filed during the preliminary motion period. *See* Paper No. 41 at 1-2. Of the parties' eight motions, only two are relevant here: Gartside's motion to designate certain claims as not corresponding to the count, and Forgac's motion for judgment that all of Gartside's claims were unpatentable under 35 U.S.C. Section 103. The APJ denied Gartside's motion to designate claims 36, 41, 45, and 46 as not corresponding to the count, concluding that Gartside had failed to show that those claims were patentably distinct from the other claims corresponding to the count. *See generally id.* at 7-11. The APJ granted in part Forgac's motion for judgment that Gartside's claims were invalid under Section 103. *See id.* at 11. The APJ first observed that while Forgac's motion was directed to all of Gartside's claims corresponding to the count (claims 34-47), Forgac only performed a Section 103 analysis as to claim 47. *See id.* at 11-12. The APJ apparently concluded that this analysis was acceptable with regard to the claims for which Gartside had not presented specific patentability arguments, namely claims 34, 35, 37-40, and 42-44, and indicated that those claims would thus stand or fall based on the arguments made on behalf of claim 47. *See id.* at 12. Since Gartside argued separately the patentability of claims 36, 41, 45, and 46, the APJ indicated that those claims would be considered apart from claim 47. *See id.*

Analyzing the claims that stood or fell with claim 47 first, the APJ held that those claims were unpatentable as obvious under Section 103. *See id.* at 12. The APJ based his conclusion on Gartside's U.S. Patent 4,552,645, which teaches a process of thermally cracking feed oil that is nearly identical to the process claimed in claim 47, either alone or in combination with Gartside's U.S. Patent 4,288,235, which discloses apparatus that may be used for both thermal and catalytic processes employing low residence times and quenching to prevent undesired cracking. *See id.* The APJ found that the motivation to combine the thermal cracking teachings of the '645 patent with a catalytic cracking process as disclosed in the '235 patent arose from the nature of the problem to be solved, *viz.*, undesired cracking due to the presence of thermal or catalytic solids. *See id.* at 15. Thus, the APJ concluded that claim 47, as well as claims 34, 35, 37-40, and 42-44, were unpatentable under Section 103. *See id.* at 12.

Having previously concluded that claims 36, 41, 45, and 46 did not stand or fall with claim 47, the APJ proceeded to analyze those claims as if Forgac had not

placed their patentability at issue. The APJ held, *sua sponte*, that claims 36, 41, 45, and 46 were unpatentable under Section 103, based on the '645 patent in view of U.S. Patent 4,419,221 (Castagnos), or on those two patents in view of the '235 patent, incorporating his reasoning with respect to claims 34, 35, 37-40, 42-44, and 47. *See id.* at 18-19. As noted above, essentially all of the limitations of claims 34, 35, 37-40, 42-44, and 47 were found in the combination of the '645 patent with the '235 patent. Since claims 36, 41, 45, and 46 each contain all of those limitations, as well as an additional kinetic residence time limitation, the APJ needed to add one additional reference to complete the combination. Accordingly, the APJ added Castagnos to the '645 and '235 patent combination, as Castagnos discloses the precise kinetic residence time recited in claims 36, 41, 45, and 46. *See id.* at 19-20. The APJ again found that the motivation to combine the teachings of the patents arose from the nature of the problem to be solved, *i.e.*, optimizing yields by avoiding undesired cracking. *See id.* at 20. [FN3]

Gartside requested reconsideration of the denial of his motion to redesignate claims 36, 41, 45, and 46 as not corresponding to the count, *see* Paper No. 45, and the granting in part of Forgac's motion to hold Gartside's claims unpatentable under Section 103, *see* Paper *1772 No. 43. On reconsideration, the APJ denied both of these requests. *See* Paper No. 49. As for the *sua sponte* holdings of unpatentability, Forgac and Gartside each filed timely responses, neither of which persuaded the examiner to depart from his earlier holdings, *see* Paper No. 50 at 15. [FN4] The APJ then ordered the parties to show cause why judgment should not be entered against them with respect to the patentability of all the claims corresponding to the count. *See id.* In response, Forgac and Gartside each requested a final hearing before the Board. *See* Paper Nos. 51 and 54.

On May 20, 1996, Forgac withdrew his request for a final hearing and authorized the APJ to cancel claims 1, 2, and 13 from the '058 patent. *See* Paper No. 63 at 1-2. Despite Forgac's withdrawal from the interference, the APJ held that the interference should proceed based on our decision in *Perkins v. Kwon*, 886 F.2d 325, 12 USPQ2d 1308 (Fed. Cir. 1989), as the issues surrounding the patentability of Gartside's claims had been fairly placed at issue and fully developed during the interference, and they therefore should be resolved for the sake of the public interest. *See* Paper No. 64 at 3-5. Gartside requested reconsideration of this order and asked that his application be remanded to the

primary examiner for further prosecution. *See* Paper No. 65 at 1. The APJ dismissed both requests, *see* Paper No. 66, and a final hearing was held on May 21, 1998.

The Board first held that the APJ properly concluded that the Board retained jurisdiction over the patentability issues raised in the interference. *See Gartside*, Paper No. 72 at 9. The Board reasoned that under our decision in *Schulze v. Green*, 136 F.3d 786, 45 USPQ2d 1769 (Fed. Cir. 1998), the Board should decide the patentability issues despite Forgac's withdrawal, as those issues were fairly raised and fully developed in the course of the interference. *See id.* at 7-9. The Board also noted that Gartside was not procedurally disadvantaged by the Board's decision to retain jurisdiction rather than remand to the examiner. *See id.* at 6-7.

Turning to the merits, the Board concluded that the APJ did not abuse his discretion [FN5] in holding that claims 34, 35, 37-40, 42-44 and 47 of the '627 application were unpatentable under Section 103. *See id.* at 19. The Board agreed with the APJ that those claims would have been obvious based on the '645 patent alone or in combination with the '235 patent. *See id.* at 19. The Board also agreed with the APJ that the motivation to combine those references arose from the nature of the problem to be solved, *viz.*, minimizing undesired cracking. *See id.* at 15.

As for claims 41, 45, and 46, the Board first held that the APJ did not abuse his discretion in denying Gartside's motion to redesignate those claims as not corresponding to the count, reasoning that Gartside had failed to show that those claims were patentably distinct from the other claims corresponding to the count. *See id.* at 21-22, 27. The Board further held that the APJ did not abuse his discretion in holding *sua sponte* that those claims were unpatentable under Section 103 based on the combination of the '645 patent and the Castagnos patent, or those two patents in view of the '235 patent, *see id.* at 28-29, and that a motivation to combine them arose from the nature of the problem to be solved (minimizing undesired cracking) and from the references themselves, *see id.* at 25-27. The Board also found that Gartside's evidence of unexpected results in the form of the "second Johnson declaration" was unpersuasive, as that evidence did not pertain to the same process as that of the claims at issue. *See id.* at 35-36.

DISCUSSION

A. Standards of Review

1. Review of Factfinding by the Board of Patent Appeals and Interferences

In *Dickinson v. Zurko*, 119 S. Ct. 1816, 50 USPQ2d 1930 (1999), the Supreme Court reversed our *en banc* decision that held that *1773 the appropriate standard of review of PTO findings of fact is the clearly erroneous standard, *see Dickinson v. Zurko*, 142 F.3d 1447, 1449, 46 USPQ2d 1691, 1693 (Fed. Cir. 1998), and held that we must apply one of the standards set forth in the Administrative Procedure Act ("APA") at 5 U.S.C. Section 706 (1994), *see Zurko*, 119 S. Ct. at 1818, 50 USPQ2d at 1931-32.

Section 706 reads in relevant part as follows:

Section 706. Scope of Review

The reviewing court shall--

* * *

(2) hold unlawful and set aside agency action, findings, and conclusions found to be--

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

* * *

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute

5 U.S.C. Section 706(2)(A), (E) (1994). In *Zurko*, the Supreme Court did not determine whether the correct standard of review for PTO findings of fact is the "arbitrary, capricious" or the "substantial evidence" test. *See Zurko*, 119 S.Ct. at 1821, 50 USPQ2d at 1934. We feel compelled to decide that question, in order to secure the standard of review through which we will test the decision of the Board in this case.

The Supreme Court has indicated that the "arbitrary, capricious" standard of review is highly deferential. Under that standard, a reviewing court "must consider whether the decision was based on a consideration of relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402, 416 (1971). Because this standard is generally considered to be the most deferential of the APA standards of review, *see e.g.*, 6

Stein et al., *Administrative Law* Section 51.03, at 51-117 (1999) ("The narrowest scope of judicial review of an agency [s] fact findings is afforded by the arbitrary, capricious, or abuse of discretion test."), the reviewing court analyzes only whether a rational connection exists between the agency's factfindings and its ultimate action, see *Hyundai Elecs. Indus. Co. v. ITC*, 899 F.2d 1204, 1209, 14 USPQ2d 1396, 1400 (Fed. Cir. 1990) (noting that the "touchstone" of the "arbitrary, capricious" standard is rationality); see also 6 *Administrative Law* Section 51.03, at 51-128.

On the other hand, the "substantial evidence" standard asks whether a reasonable fact finder could have arrived at the agency's decision, see *Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); see generally 3 Charles H. Koch, Jr., *Administrative Law and Practice* Section 10.3 [1], at 22- 26 (2d ed. 1997), and is considered to be a less deferential review standard than "arbitrary, capricious." See *American Paper Inst., Inc. v. American Elec. Power Serv. Corp.*, 461 U.S. 402, 412-13 n.7 (1983) (characterizing the "arbitrary, capricious" standard as "more lenient" than the "substantial evidence" standard); *Abbott Lab. v. Gardner*, 387 U.S. 136, 143 (1967) (characterizing "substantial evidence" review as "more generous judicial review" than "arbitrary, capricious" review). The Supreme Court has described "substantial evidence" in the following manner:

Substantial evidence is more than a mere scintilla. It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. . . . Mere uncorroborated hearsay or rumor does not constitute substantial evidence.

Consolidated, 305 U.S. at 229-30 (citations omitted); see also *AK Steel Corp. v. United States*, 192 F.3d 1367, 1371 (Fed. Cir. 1999) (quoting *Consolidated*). The Court has emphasized that "substantial evidence" review involves examination of the record as a whole, taking into account evidence that both justifies and detracts from an agency's decision. See *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 487-88 (1951). The Court has also stated, however, that "the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence." See *Consolo v. Federal Maritime Comm'n*, 383 U.S. 607, 620 (1966).

Moreover, courts have recognized that the "arbitrary, capricious" standard is one of default. See *Association of Data Processing Serv. Orgs., Inc. v. Board of*

Governors of Fed. Reserve Sys., 745 F.2d 677, 683 (D.C. Cir. 1984) (the "arbitrary, capricious" standard "is a catch-all, picking up administrative misconduct not covered by the other more specific paragraphs."); see also *Olenhouse v. Commodity Credit Corp.*, 42 F.3d 1560, 1575 n.25 (10th Cir. 1994). In other words, the "arbitrary, capricious" standard applies when the "substantial evidence" test *1774 of section 706(2)(E) is deemed inapplicable. See *Aircraft Owners & Pilots Ass'n v. FAA*, 600 F.2d 965, 969 (D.C. Cir. 1979). Thus, we return to the statute.

Section 706(2)(E) provides that "substantial evidence" review is afforded to agency factfinding performed during an adjudication in two circumstances: (1) factfinding performed in "a case subject to sections 556 and 557 of this title," and (2) factfinding performed in a case "reviewed on the record of an agency hearing provided by statute." 5 U.S.C. Section 706(2)(E). Factfinding by the Board does not fall within the first category, as Section 554 excludes PTO adjudication from the trial-type procedures set forth in 5 U.S.C. Sections 556 and 557. Specifically, section Section 554(a)(1) excludes agency adjudication from these requirements when the subject matter of that adjudication is subject to a subsequent trial *de novo*, see 5 U.S.C. Section 554(a)(1) (1994), [FN6] as in the case of Board adjudication, see 35 U.S.C. Section 145 (1994) ("Civil action to obtain a patent"); *id.* Section 146 (1994) ("Civil action in case of interference"). Accordingly, these interrelated statutes dictate that Board factfinding does not fall within the first category of Section 706(2)(E).

[1] We next consider whether our review of Board factfindings made in the course of its adjudicatory proceedings falls within the second category of Section 706(2)(E), *i.e.*, "or otherwise reviewed on the record of an agency hearing provided by statute." 5 U.S.C. Section 706(2)(E). Section 144 explicitly provides that we must review Board decisions "on the record" developed by the PTO, see 35 U.S.C. Section 144 (1994) ("The United States Court of Appeals for the Federal Circuit shall review the decision from which an appeal is taken *on the record* before the Patent and Trademark Office.") (emphasis added), and it is for this reason that the Commissioner is required to convey the record to us in the event of an appeal, see *id.* Section 143. Moreover, the "hearing" upon which the "record" is based is "provided by" 35 U.S.C. Section 7(b), which states that:

The Board of Patent Appeals and Interferences shall, on written appeal of an applicant, review adverse decisions of examiners upon applications for patents and shall determine priority and patentability of invention in interferences declared under section 135(a) of this title. Each appeal and interference shall be *heard* by at least three members of the Board of Patent Appeals and Interferences, who shall be designated by the Commissioner. Only the Board of Patent Appeals and Interferences has the authority to grant *rehearings*.

35 U.S.C. Section 7(b) (1994) (emphasis added). Thus, the plain language of Sections 7 and 144 of Title 35 indicates that we review Board decisions "on the record of an agency hearing provided by statute," and that we should therefore review Board factfinding for "substantial evidence." *See also* Thomas Leonard Stoll, *A Clearly Erroneous Standard of Review*, 79 J. Pat. & Trademark Off. Soc'y 100, 106 (1997) (arguing in favor of "substantial evidence" review based on 35 U.S.C. Sections 7(b) and 144).

In appeals from the Board, we have before us a comprehensive record that contains the arguments and evidence presented by the parties, including all of the relevant information upon which the Board relied in rendering its decision. *See* 35 U.S.C. Section 143 (1994) (" [T]he Commissioner shall transmit to the United States Court of Appeals for the Federal Circuit a certified list of the documents comprising the record in the Patent and Trademark Office."). That record, when before us, is closed, in that the Board's decision must be justified within the four corners of that record. The record before us on appeal thus dictates the parameters of our review. We cannot look elsewhere to find justification for the Board's decision. Furthermore, the record reflects the results of a proceeding in the PTO during which the applicant has been afforded an opportunity to bring forth the facts thought necessary to support his or her position. Accompanying the record is a detailed opinion from the Board. We have expressly held that the Board's opinion must explicate its factual conclusions, enabling us to verify readily whether those conclusions are indeed supported by "substantial evidence" contained within the record. *See Gechter v. Davidson*, 116 F.3d 1454, 1460, 43 USPQ2d 1030, 1035 (Fed. Cir. 1997) (" [W]e hold that the Board is required to set forth in its opinions specific findings of fact and conclusions of law adequate to form a basis for our review.").

In addition to the statutory language discussed above, Supreme Court precedent and the law of our sister

circuits also indicate that "substantial evidence" review is appropriate in view of the plenary nature of the record before us. The Supreme Court has *1775 stated generally that the "basic requirement" for "substantial evidence" review is that the agency hearing produce a record that serves as the foundation for the agency's action. *See Overton Park*, 401 U.S. at 415; *Camp v. Pitts*, 411 U.S. 138, 141 (1973) (noting that "substantial evidence" review "is appropriate when reviewing findings made on a hearing record"). In *Zurko* the Court echoed these prior decisions when it intimated that "substantial evidence" review is the appropriate standard for our review of Board factfinding. *See Zurko*, 119 S. Ct. at 1823, 50 USPQ2d at 1936 ("A reviewing court reviews an agency's reasoning to determine whether it is 'arbitrary' or 'capricious,' or, if bound up with a record-based factual conclusion, to determine whether it is supported by 'substantial evidence.'").

Chrysler Corp. v. DOT, 472 F.2d 659 (6th Cir. 1972), is instructive. In that case, the court had to determine whether the "arbitrary, capricious" or the "substantial evidence" test should be applied to automobile safety standards promulgated by the Secretary of Transportation. Those standards emerged from a statutorily mandated agency rulemaking hearing that was not "formal" in the sense of cases subject to sections 556 and 557 of the APA. The agency argued that the appropriate standard of review was the most deferential "arbitrary, capricious" standard, because the promulgated safety standards emerged not from formal adjudication, but from informal rulemaking. *See id.* at 667. To the contrary, the industry petitioners argued that the default standard should not apply, because the safety standards arose from hearings compelled by statute, and the scope of appellate review was confined to the record made before the agency in the informal rulemaking process. *See id.* The court concluded that the "substantial evidence" test of section 706(2)(E) should apply because the agency was required by law to compile a record that would restrict the scope of appellate review. *See id.* at 668. Consequently, only the evidence in the record could be used by the appellate court to justify or refute the agency action. In contrast, the court noted that when an agency decision is made on "the basis of data contained in its own files or on its own views or opinions . . . a reviewing court cannot test the rules as promulgated against the evidence in the agency's record." *Id.* at 669. In those circumstances, the more deferential standard of review would be appropriate. [FN7]

The reasoning of the D.C. Circuit also supports our conclusion that "substantial evidence" review applies when the reviewing court must confine its review of agency factfinding to the record produced by the agency proceeding. In *Data Processing*, the D.C. Circuit considered the APA standards of review, and concluded that "[t]he distinctive function of paragraph (E)—what it achieves that paragraph (A) does not—is to require substantial evidence to be found *within the record of closed-record proceedings* to which it exclusively applies." *Data Processing*, 745 F.2d at 684 (emphasis added); *see also id.* at 683 ("The ["substantial evidence" test] is only a specific application of the ["arbitrary, capricious" test], separately recited in the APA . . . to emphasize that in the case of [section 706(2)(E)] proceedings the factual support must be found in the closed record as opposed to elsewhere.").

Because our review of the Board's decision is confined to the factual record compiled by the Board, we accordingly conclude that the "substantial evidence" standard is appropriate for our review of Board factfindings. *See* 5 U.S.C. Section 706(2)(E).

2. Other Applicable Standards of Review

[2] Whether the Board possessed jurisdiction to continue the interference in order to decide the patentability of Gartside's claims is a question of law that we review *de novo*. *See James M. Ellett Constr. Co. v. United States*, 93 F.3d 1537, 1541 (Fed. Cir. 1996) ("Jurisdiction is a question of law [that] . . . we review *de novo*"). We review for an abuse of discretion the Board's decision to resolve issues of patentability that were not placed in issue by the parties during the interference. *See* 5 U.S.C. Section 135(a) (providing that the Board "*may* determine questions of patentability" during the course of an interference) (emphasis added); 37 C.F.R. Section 1.641(a) (1999); [FN8] *Perkins*, 886 F.2d at 328, 12 USPQ2d at 1311*1776 ("The word 'may' in Section 135(a) accommodates the situation when patentability is not placed at issue during the priority contest, but it would contradict the remedial purpose of the legislation if the Board could refuse to decide questions of patentability for which there had been adduced an appropriate record."). An abuse of discretion occurs when a decision is based on an erroneous interpretation of law or clearly erroneous factfinding, or if that "decision represents an unreasonable judgment in weighing relevant factors." *A. C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 960 F.2d 1020, 1039, 22 USPQ2d 1321, 1333 (Fed. Cir. 1992) (*en banc*). In view of our holding that we

review Board factfinding for substantial evidence, we will modify the second criterion accordingly.

Whether a claimed invention is unpatentable as obvious under Section 103 is a question of law based on underlying findings of fact. *See In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ2d 1614, 1616 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966)). The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact. *See id.* at 1000, 50 USPQ2d at 1617. The Board's legal conclusion of obviousness is reviewed *de novo*. *See In re Rouffet*, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1455 (Fed. Cir. 1998); *see also* 5 U.S.C. Section 706 (1994) ("To the extent necessary to decision and when presented, the reviewing court shall decide all relevant questions of law. . ."). Although we have previously reviewed the Board's factual determinations in an obviousness analysis for clear error, *see Dembiczak*, 175 F.3d at 998, 50 USPQ2d at 1616; *Kemps*, 97 F.3d at 1429-30, 40 USPQ2d at 1311-12, we now review them for substantial evidence.

B. Jurisdiction

Gartside argues that the Board erred in retaining jurisdiction over the interference proceeding, as no interfering subject matter remained after Forgac's withdrawal from the interference. Gartside thus contends that the interference should have been dissolved and that the patentability issues should have been decided by the examiner *ex parte*. Gartside further asserts that the Board abused its discretion in addressing those issues, as the public interest relied on in *Perkins v. Kwon* was not here implicated, and the denial of remand to the examiner deprived him of certain procedural safeguards, *e.g.*, the right to amend, refile as a continuation application, and present evidence of unexpected results.

Citing *Guinn v. Kopf*, 96 F.3d 1419, 40 USPQ2d 1157 (Fed. Cir. 1996), the Commissioner responds that Forgac's withdrawal did not divest the Board of jurisdiction to decide the patentability issues developed during the interference, and that under *Perkins*, the Board must decide all issues fairly raised and fully developed during the interference. The Commissioner further contends that the Board did not abuse its discretion in deciding the patentability of Gartside's claims because the public interest in *Perkins* was implicated and Gartside was denied no procedural safeguards, as Gartside's procedural options in the interference paralleled his options in *ex parte*

examination.

Section 135(a) sets forth the Commissioner's authority to declare interference proceedings and the Board's jurisdiction to resolve issues relating to priority and patentability that arise during such proceedings. Section 135(a) provides in relevant part that:

(a) Whenever an application is made for a patent which, in the opinion of the Commissioner, would interfere with any pending application, or with any unexpired patent, an interference may be declared and the Commissioner shall give notice of such declaration to the applicants, or the applicant and patentee, as the case may be. The Board of Patent Appeals and Interferences *shall* determine questions of priority of the inventions and *may* determine questions of patentability.

35 U.S.C. Section 135(a) (1994) (emphasis added). In *Perkins*, we held that under Section 135(a), the Board *should* decide issues relating to priority and patentability that are fairly raised and fully developed during the interference, despite the permissive language of Section 135(a) with respect to patentability issues. *See Perkins*, 886 F.2d at 328-29, 12 USPQ2d at 1310-11 ; *see also Schulze*, 136 F.3d at 792, 45 USPQ2d at 1774- 75 ; *Wu v. Wang*, 129 F.3d 1237, 1242, 44 USPQ2d 1641, 1645 (Fed. Cir. 1997). We noted that the permissive language addresses "the situation *1777 when patentability is not placed at issue during the priority contest, but it would contradict the remedial purpose of the legislation if the Board could refuse to decide questions of patentability for which there had been adduced an appropriate record." *See Perkins*, 886 F.2d at 328, 12 USPQ2d at 1311 .

In *Guinn* we extended *Perkins*, holding that even when a party attempts to terminate the interference by disclaiming all of its claims relating to the count, the Board should decide priority when priority issues have been fairly raised and fully developed at the Board. *See Guinn*, 96 F.3d at 1421-22, 40 USPQ2d at 1159 . In that case, Guinn attempted to terminate the interference by disclaiming his one claim that corresponded to the count, *see* 35 U.S.C. Section 253 (1994), and moving to dismiss for lack of jurisdiction on the basis of a lack of controversy. *See Guinn*, 96 F.3d at 1420, 40 USPQ2d at 1158 . Guinn argued that absent a priority dispute, the Board lacked jurisdiction to enter judgment against him in the interference pursuant to 37 C.F.R. Section 1.662. *See id.* Rather than dismiss,

however, the Board entered judgment against Guinn. *See id.*

Guinn appealed and we affirmed, holding that the disclaimer of all the claims corresponding to a count did not divest the Board of jurisdiction over the interference. *See id.* at 1421-22, 40 USPQ2d at 1159 . We reasoned that once an interference has been properly declared, Section 135(a) directs that the Board "shall determine questions of priority," and that under *Perkins*, the Board should resolve priority issues that have been fully developed before the Board. *See id.*

[3] Based on *Perkins* and *Guinn*, we agree with the Commissioner that Forgac's withdrawal did not divest the Board of jurisdiction over the interference, and that the Board did not abuse its discretion in deciding the patentability of Gartside's claims. Even though *Guinn* involved a remaining issue of priority rather than patentability, we agree with the Commissioner that *Guinn* is sufficiently on point. In Forgac's notice to withdraw his request for a final hearing, Forgac authorized the APJ to cancel claims 1, 2, and 13 from the 058 patent, *see* Paper No. 63 at 2, the functional equivalent of Guinn disclaiming his claims corresponding to the count under Section 253. Likewise, neither party here disputes that the interference was properly declared. While part of our reasoning in *Guinn* hinged on the fact that Section 135(a) mandates that the Board "*shall* determine questions of priority," in *Perkins* we interpreted the language "*may* determine issues of patentability" as nearly mandatory when those issues have been fairly raised and fully developed before the Board. *See Perkins*, 886 F.2d at 328-29, 12 USPQ2d at 1310-11 . Moreover, as with the priority issues in *Guinn*, the issues surrounding the patentability of Gartside's claims were fairly raised and fully developed during the proceeding. [FN9] Accordingly, we conclude that the Board properly resolved these issues under Section 135(a).

As we noted *supra*, the APJ raised the issue of the patentability of claims 41, 45, and 46 *sua sponte*. To the extent that the *sua sponte* holding meant that Forgac did not properly place the patentability of these claims at issue before the Board, we agree with the Commissioner that the Board acted within its discretion to decide the patentability of those claims based on the public interest as noted in *Perkins* and the fact that Gartside was in no way prejudiced by resolution of those issues by the Board rather than the examiner.

First, the public interest as discussed in *Perkins* is clearly served by the Board's resolution of the patentability issues surrounding Gartside's claims. The Board had already addressed the patentability issues with respect to claims 34, 35, 37-40, and 42-44, and the validity of claims 41, 45, and 46 turned on two of the same references used to invalidate those other claims. By deciding the patentability of claims 41, 45, and 46, the Board avoided yet another round of duplicative arguments before the examiner and achieved a timely resolution to the benefit of the parties and the public in general. As we stated in *Perkins*:

The Board, by resolving both priority and patentability when these questions are fully presented, settles not only the rights between the parties but also rights of concern to the public. The public interest in *1778 the benefits of a patent system is best met by procedures that resolve administratively questions affecting patent validity that arise before the PTO. To do otherwise is contrary to the PTO's mission to grant presumptively valid patents, 35 U.S.C. Section 282, and thus disserves the public interest.

Perkins, 886 F.2d at 328-29, 12 USPQ2d at 1311 .

Moreover, we agree with the Commissioner that Gartside was not denied any procedural safeguards by the Board's refusal to remand to the examiner. Gartside was afforded the opportunity to redefine the interfering subject matter by amending his claims, *see* 37 C.F.R. Section 1.633(c)(2) (1999), and he was free to file a continuation application, *see* 37 C.F.R. Section 1.633(d) (1999); *see also* 35 U.S.C. Section 120 (1994). Moreover, 37 C.F.R. Section 1.639 permits a party to introduce evidence in support of motions, oppositions, and replies, and 37 C.F.R. Section 1.640(e)(3) also enables a party to introduce evidence in response to an order to show cause. Although Gartside alleges that he was prejudiced for want of other assorted procedural safeguards, these allegations are similarly without merit.

In sum, we conclude that the Board did not err in retaining jurisdiction over the interference to decide the patentability of Gartside's claims.

C. The Patentability of Claims 34, 35, 37-40, 42-44 and 47

Gartside argues that the Board erred in holding claims 34, 35, 37-40, 42-44, and 47 unpatentable under Section 103, because the references do not teach or

suggest the claimed invention. Gartside principally contends that the '645 and '235 patents are directed to *thermal* cracking processes, and that there was no suggestion in the art to employ a quench step in *catalytic* cracking processes. Gartside further asserts that the '235 patent teaches away from employing a quench in catalytic cracking. The Commissioner responds that the claims would have been obvious over Gartside's '645 and '235 patents, as those references contain each and every element of the claimed processes. The Commissioner argues that one of ordinary skill in the art would have been motivated to combine the '645 and '235 patents, as they both attempt to solve the same problem, *viz.*, continued thermal cracking of the cracked product. The Commissioner also contends that the '235 patent does not teach away from employing a quench in catalytic cracking.

A claimed invention is unpatentable as obvious "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. Section 103(a) (1994); *see Dembiczak*, 175 F.3d at 998, 50 USPQ2d at 1616 . "The ultimate determination . . . whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." *Dembiczak*, 175 F.3d at 998, 50 USPQ2d at 1616 (citing *Graham*, 383 U.S. at 17-18, 148 USPQ at 467). We have further indicated "that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." *Id.* at 999, 50 USPQ2d at 1617 . That suggestion may come from, *inter alia*, the teachings of the references themselves and, in some cases, from the nature of the problem to be solved. *See Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996); *Rouffet*, 149 F.3d at 1355, 47 USPQ2d at 1456 .

[4] We agree with the Commissioner that substantial evidence supports the Board's factfinding and that the Board correctly concluded that the claims were unpatentable under Section 103. As an initial matter, we agree with the Commissioner that substantial evidence supports the Board's finding that Gartside's '645 and '235 patents contain all the limitations set

forth in claim 47. *See Gartside*, Paper No. 72 at 12-13. The Board found that all the limitations of claim 47 are found in the '645 patent, except that the '645 patent accomplishes cracking by a thermal rather than a catalytic mechanism. *See Gartside*, Paper No. 72 at 13. This finding is clearly supported by the following disclosure in the '645 patent:

[T]he reaction proceeds at 150 degrees F for a residence time of about 0.05 to 0.40 seconds, preferably from [sic] 0.20 to 0.30. The product gases are separated from the solids in separator 8. . . and the product gases pass overhead through a line 22 and are immediately quenched with typical quench oil that is delivered to line 22 through line 36. The quenched product is passed through a cyclone 24 where entrained solids are removed. . . .

*1779 '645 patent, col. 2, l. 62 to col. 3, l. 2. The Board found the missing limitation in the '235 patent, which teaches that the claimed apparatus may be used in catalytic cracking processes involving quenching and separation steps as in claim 47. *See Gartside*, Paper No. 72 at 13 (citing '235 patent, col. 4, ll. 42-47). Based on the foregoing, we conclude that the Board's finding that all of the limitations of the claimed invention are found in Gartside's '645 and '235 patents is supported by substantial evidence.

Gartside further contends that the Board erred in finding that sufficient motivation existed to combine the '645 and '235 patents to arrive at the invention in claim 47. *See id.* at 14. We disagree. As the Board indicates, the '645 patent addresses the problem of hot particulate solids continuing to crack the product after the desired thermal cracking reaction has been completed, solving that problem by applying a quench after primary separation of cracking particles from the product. *See Paper No. 72* at 14-15. The Board further found that the '235 patent suggests that the presence of either hot thermal or hot catalytic solids in the product stream may cause undesired cracking. *See id.* at 15 (citing '235 patent, col. 1, ll. 6-10). These disclosures provide substantial evidence supporting the Board's finding that one of ordinary skill in the art would have been motivated also to apply the teachings of the '645 patent relating to arresting undesired cracking in thermal processes to minimize undesired cracking in catalytic cracking processes.

Gartside also asserts that the '235 patent teaches away from applying the process disclosed in the '645 patent to catalytic reactions. This contention is without merit. Gartside cites the following language from the '235

patent:

In some reaction systems, specifically catalytic reactions at low or moderate temperatures, quench of the product gas is undesirable from a process standpoint. In other cases, the quench is ineffective in terminating the reaction. Thus, these reaction systems require immediate separation of the phases to remove catalyst from the gas phases. Once the catalyst is removed, the mechanism for reaction is no longer present.

'235 patent, col. 1, ll. 49-56. As the Board found, however, this portion of the specification addresses the undesirability of a quench used in catalytic reactions at low to moderate temperatures, not the high temperature reactions at issue in the '645 patent, and teaches that in other undefined systems, quenching is ineffective. *See Gartside*, Paper No. 72 at 16. That is not a clear "teaching away" from use of a quench in all catalytic systems. Accordingly, substantial evidence supports the Board's finding that this disclosure does not teach away from the claimed invention. *See id.* at 16-17.

Having concluded that the Board's factual findings relating to its Section 103 analysis are supported by substantial evidence, we further conclude that the Board did not err as a matter of law that claims 34, 35, 37-40, 42-44 and 47 are invalid as obvious. We have carefully considered Gartside's additional arguments but find them unpersuasive.

D. Patentability of Claims 41, 45 and 46

Gartside argues that the Board erred in its *sua sponte* holding that claims 41, 45, and 46 are unpatentable under Section 103 based on the '645 patent in view of the Castagnos patent, or on those two patents in view of the '235 patent. Gartside contends that the Board erred in combining those patents, because there was no teaching or suggestion to use a 0.1 to 0.6 second kinetic residence time in a catalytic cracking process. Gartside further argues that his showing of unexpected results, as described in the second Johnson Declaration, constitutes a secondary consideration weighing in favor of nonobviousness, and that the Board erred in discounting those results. The Commissioner responds that the Board correctly held that the claims were unpatentable, arguing that the motivation to combine the references arose from the references themselves, as well as the nature of the problem to be solved, *viz.*, maximizing reaction conditions in cracking processes by minimizing

residence time. The Commissioner further contends that Gartside's evidence of unexpected results is not probative of nonobviousness, as the examples disclosed in the second Johnson Declaration do not correspond to any process within the scope of the claims at issue.

[5] We agree with the Commissioner that substantial evidence supports the Board's finding that a motivation to combine the '645, '235, and Castagnos patents arose from the teachings of the references themselves and the nature of the problem to be solved. [FN10] As the Board found, use of low residence times to arrest undesired cracking in the '645 *1780 and '235 patents was part of a "trend in the art towards short residence times." *Gartside*, Paper No. 72 at 27; see '645 patent, col. 1, ll. 61-67 (disclosing residence times of between 0.05 to 0.4 seconds); '235 patent, title ("LOW RESIDENCE TIME SOLID- GAS SEPARATION DEVICE AND SYSTEM") and col. 7, ll. 26-31 (disclosing that adjustment of the claimed apparatus may yield residence times of 0.1 and 0.5 seconds). In view of this trend, one of ordinary skill who was attempting to minimize undesired cracking reactions would have been directed by these two patents to the Castagnos patent, which describes low residence time catalytic reactions and which discloses the precise residence time in the disputed claims. See Castagnos patent, col. 2, ll. 6-12 (disclosing residence times of "about 0.1 to about 1 second"). Accordingly, we conclude that substantial evidence supports the Board's finding that a motivation existed to combine these patents to obtain the invention claimed in claims 41, 45, and 46.

Gartside also argues that the Board erred in finding that the second Johnson declaration, which allegedly contains evidence of unexpected results, [FN11] did not weigh in favor of the patentability of claims 41, 45, and 46. We disagree. The Board essentially adopted the APJ's order to show cause as it pertained to the second Johnson declaration, finding that the process recited in the declaration failed to reproduce the separation and quenching steps of the claimed process. See *Gartside*, Paper No. 72 at 35-36. This finding is supported by the declarant's own statements, which reveal that the quench in the declaration experiment preceded the separation of product from catalyst. See Paper No. 48 at 3, Para. 9. Accordingly, we agree with the Commissioner that substantial evidence supports the Board's finding that the examples in the declaration do not correspond to any process within the scope of the claims, and the declaration is therefore not

probative of nonobviousness. See *Gartside*, Paper No. 72 at 35-36.

In summary, we conclude that all of the Board's disputed factfindings are supported by substantial evidence and that the Board did not err as a matter of law in holding that claims 41, 45, and 46 are invalid under Section 103. [FN12]

CONCLUSION

The Board did not err in maintaining jurisdiction over the interference proceeding despite the withdrawal of the junior party, and further did not err in deciding the patentability of Gartside's claims that corresponded to the count. To the extent that the Board's decision to resolve the patentability issues surrounding claims 41, 45, and 46 under Section 135(a) was discretionary, the Board did not abuse its discretion. As for the patentability of claims 34, 35, and 37-47, all of the Board's disputed factual findings relating to its obviousness analysis are supported by substantial evidence, and we find no error in the Board's conclusion that the claims are unpatentable as obvious as a matter of law.

Accordingly, we

AFFIRM.

FN1 37 C.F.R. Section 1.601(i) defines an "interference" in relevant part as follows:

An interference is a proceeding instituted in the Patent and Trademark Office before the Board to determine any question of patentability and priority of invention between two or more parties claiming the same patentable invention. . . . An interference may be declared between one or more pending applications and one or more unexpired patents naming different inventors when, in the opinion of an examiner, any application and any unexpired patent contain claims for the same patentable invention.

37 C.F.R. Section 1.601(i) (1999).

FN2 37 C.F.R. Section 1.601(f) defines "count" as follows:

A count defines the interfering subject matter between two or more applications or between one or more applications and one or more patents. At the time the interference is initially declared, a count should be broad enough to encompass all of the claims that are

patentable over the prior art and designated to correspond to the count.

37 C.F.R. Section 1.601(f) (1999).

FN3 Although not appealed here, the APJ also concluded that claims 1, 2, and 13 of Forgac's '058 patent were all unpatentable under Section 103 based on the '645 patent and U.S. Patent 4,764,268, or over those two references in combination with the '235 patent. *See id.* at 21.

FN4 The APJ noted that in his response, Gartside had not contested the APJ's *sua sponte* holding that claim 36 was unpatentable (Paper No. 47), *see* Paper No. 50 at 14, and the APJ thus rendered judgment accordingly. Likewise, the Board did not address this claim in its final decision, *see* Paper No. 72 at 10 n.10, and Gartside does not argue the patentability of claim 36 on appeal.

FN5 37 C.F.R. Section 1.655(a) sets forth the Board's standard of review with respect to interlocutory orders entered by the APJ:

The Board may also consider whether entry of any interlocutory order was an abuse of discretion. All interlocutory orders shall be presumed to have been correct, and the burden of showing an abuse of discretion shall be on the party attacking the order.

37 C.F.R. Section 1.655(a) (1999).

FN6 Section 554(a)(1) provides that:

(a) This section applies, according to the provisions thereof, in every case of adjudication by statute to be determined on the record after opportunity for an agency hearing, *except* to the extent that there is involved--

(1) a matter subject to a subsequent trial of the law and the facts *de novo* in a court

5 U.S.C. Section 554(a)(1) (1994) (emphasis added).

FN7 We recognize that a distinction has been drawn between formal and informal proceedings to determine which APA standard to apply, with the most deferential standard thought to be applicable in reviewing agency decisions made in informal settings. *See 6 Administrative Law* Section 51.01 [2], at 51-48. This distinction alone, however, cannot dispositively answer the standard of review question when an agency hearing is compelled by a law that also

requires a closed record to be made of the proceeding, and Congress has limited the scope of appellate review to the record made of the agency's deliberations.

FN8 Section 1.641(a) provides that:

During the pendency of the interference, if the administrative patent judge becomes aware of a reason why a claim designated to correspond to a count may not be patentable, the administrative patent judge *may* enter an order notifying the parties of the reason and set a time within which each party may present its views, including any argument and any supporting evidence, and, in the case of the party whose claim may be unpatentable, any appropriate preliminary motions under Sections 1.633 (c), (d) and (h).

37 C.F.R. Section 1.641(a) (1999) (emphasis added).

FN9 Prior to Forgac's withdrawal, Forgac raised the issue of the patentability of all of Gartside's claims in a preliminary motion to the APJ, Gartside opposed that motion, and Forgac in turn replied to that opposition. *See* Papers No. 20, 29, and 36. Following the APJ's granting-in-part of Gartside's motion, Gartside further developed this issue in his request for reconsideration. *See* Papers No. 41 and 43. Moreover, the APJ independently raised and developed the issue of the patentability of claims 41, 45, and 46 in his *sua sponte* holding of unpatentability, to which Gartside also responded. *See* Papers No. 41 and 47. Even after Forgac's withdrawal, Gartside was provided with additional opportunities to develop the patentability issues before the Board. *See* Gartside's BPAI Br. at 4-24, 27-30.

FN10 The Board did not perform a separate "motivation to combine" analysis, but incorporated the reasoning from its conclusion that claims 41, 45, and 46 were not patentably distinct from Gartside's other claims that corresponded to the count. *See Gartside*, Paper No. 72 at 25-29.

FN11 According to the second Johnson declaration, these unexpected results include a 5% increase in gasoline yield and considerably less undesired dry gas and liquefied petroleum. *See* Paper No. 48 at 8, Paragraphs 19-21.

FN12 We will only briefly note Gartside's contention that the Board erred in even addressing the patentability of these claims. We agree with the Commissioner that the Board properly upheld the APJ's denial of Gartside's motion to redesignate these claims as not corresponding to the count. *See Gartside*, Paper No. 72 at 28. In short, we agree with the Board

that these claims are not patentably distinct from the other claims corresponding to the count for the same reasons that these claims are unpatentable under Section 103.

C.A.Fed.

53 U.S.P.Q.2d 1769

END OF DOCUMENT

Appendix 16: *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303
(Fed. Cir. 1983)

▽

W.L. Gore & Associates, Inc.

v.

Garlock, Inc.

Court of Appeals, Federal Circuit

Nos. 83-613/614

Decided Nov. 14, 1983

United States Patents Quarterly Headnotes

PATENTS

[1] Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)

Parties' argument relating to salutary injunction of FRCivP 52(a) cannot be controlling on all issues, where dispositive legal error occurred in interpretation and application of patent statute, 35 USC.

PATENTS

[2] Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)

Findings that rest on erroneous view of law may be set aside on that basis.

PATENTS

[3] Construction of specification and claims -- Claim defines invention (§ 22.30)

Claims measure and define invention.

PATENTS

[4] Construction of specification and claims -- Combination claims (§ 22.35)

Infringement -- Process patents (§ 39.65)

Court's restriction of claimed multi-step process to one step constitutes error, whether done at behest of patentee relying on that restriction to establish infringement by one who employs only that one step in process otherwise distinct, or at behest of accused infringer relying on that restriction to establish invalidity by showing that one step in prior art process otherwise distinct; invention must be considered as whole.

PATENTS

[5] Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)

CAFC is not at liberty to substitute its own for district court's findings underlying district court's conclusion that claim is invalid.

PATENTS

[6] Patentability -- Anticipation -- Process (§ 51.225)

It is irrelevant that those using invention may not have appreciated results where patent owner's operation of device is consistent, reproducible use of claimed invention; were that alone enough to prevent anticipation, it would be possible to obtain patent for old and unchanged process.

PATENTS

[7] Use and sale -- Extent and character of use (§ 69.5)

Nonsecret use of claimed process in usual course of producing articles for commercial purposes is public use.

PATENTS

[8] Use and sale -- Extent and character of use (§ 69.5)

Patentees' commercialization of product produced by its patented process can result in forfeiture of patent granted them for that process on application filed by them more than one year later; however, third party secret commercialization of process cannot be bar to patent grant on that process.

PATENTS

[9] Patent grant -- Intent of patent laws (§ 50.15)

Early public disclosure is linchpin of patent system.

PATENTS

[10] Interference -- Priority (§ 41.70)

Law disfavors prior inventor who benefits from process by selling its product but suppresses, conceals, or otherwise keeps process from public, as against later inventor who promptly files patent application from which public will gain disclosure of process.

PATENTS

[11] Patentability -- Evidence of -- In general (§ 51.451)

District court that in its consideration of prior art disregarded unpredictability and unique nature of product to which claimed inventions relate errs.

PATENTS

[12] Construction of specification and claims -- By prior art (§ 22.20)

District court that in its consideration of prior art considers claims in less than their entireties errs.

PATENTS

[13] Patentability -- Evidence of -- Suggestions of prior art (§ 51.469)

District court that considers references in less than their entireties, i.e., in disregarding disclosures in references that diverge from and teach away from invention at hand, errs.

PATENTS

[14] Construction of specification and claims -- Comparison with other claims (§ 22.40)

Claims must be considered individually and separately.

PATENTS

[15] Patentability -- Anticipation -- Combining references (§ 51.205)

There must have been something present in teachings in references to suggest to one skilled in art that claimed invention before court would have been obvious.

PATENTS

[16] Patentability -- Evidence of -- Suggestions of prior art (§ 51.469)

Fact that patentee proceeded contrary to accepted wisdom of prior art is strong evidence of nonobviousness.

PATENTS

[17] Patentability -- Tests of -- Skill of art (§ 51.707)

Imbuing one of ordinary skill in art with knowledge of invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to insidious effect of hindsight syndrome wherein that which only inventor taught is used against its teacher.

PATENTS

[18] Patentability -- Invention -- In general (§ 51.501)

Patentability -- Tests of -- Skill of art (§ 51.707)

Decisionmaker must forget what he or she has been taught at trial about claimed invention and cast mind back to time invention was made to occupy mind of one skilled in art who is presented only with references, and who is normally guided by then-accepted wisdom in art.

PATENTS

[19] Pleading and practice in courts -- Burden of proof -- Validity (§ 53.138)

Presumption for patent grant -- Patent Office consideration of prior art (§ 55.5)

It is not law that presumption of validity is weakened greatly where Patent Office has failed to consider pertinent prior art; presumption has no separate evidentiary value; it cautions decisionmaker against

rush to conclude invalidity; submission of additional art that is merely "pertinent" does not dispel that caution; however, inescapable burden of persuasion on one who would prove invalidity remains throughout trial.

PATENTS

[20] Pleading and practice in courts -- Burden of proof -- Validity (§ 53.138)

Presumption from patent grant -- Patent Office consideration of prior art (§ 55.5)

Burden of proving invalidity may be facilitated by prior art that is more pertinent than that considered by PTO.

PATENTS

[21] Patentability -- Evidence of -- In general (§ 51.451)

District court that specifically declines to consider objective evidence of nonobviousness errs; that evidence can often serve as insurance against insidious attraction of siren hindsight when confronted with difficult task of evaluating prior art; even when prior art evidence points more in direction of nonobviousness than obviousness, objective evidence may tend to reassure decisionmaker.

PATENTS

[22] Patentability -- Anticipation -- In general (§ 51.201)

Anticipation requires disclosure in single prior art reference of each element of claim under consideration.

PATENTS

[23] Patentability -- Anticipation -- Process (§ 51.225)

Patentability -- Composition of matter (§ 51.30)

Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting characteristics of products that might result from practice of processes disclosed in references.

PATENTS

[24] Patentability -- Anticipation -- Infringement as test (§ 51.211)

Accused infringer's employment of process of dominating patent is not anticipation of invention described and claimed in improvement patent.

PATENTS

[25] Patentability -- Anticipation -- In general (§ 51.201)

Patentability -- Invention -- In general (§ 51.501)

Inherency and obviousness are distinct concepts.

PATENTS

[26] Patentability -- Evidence of -- In general (§ 51.451)

All evidence bearing on obviousness issue, as with any other issue raised in conduct of judicial process, must be considered and evaluated before required legal conclusion is reached.

PATENTS

[27] Patentability -- Evidence of -- In general (§ 51.451)

Objective evidence of nonobviousness, i.e., "indicia" of *Graham v. John Deere Co.*, 148 USPQ 459, may in given case be entitled to more weight or less, depending on its nature and its relationship to invention's merits; it may be most pertinent, probative, and revealing evidence available to aid in reaching conclusion on obvious/nonobvious issue.

PATENTS

[28] Patentability -- Evidence of -- Commercial success -- In general (§ 51.4551)

Praise greeting products claimed in patent from suppliers, including owner of prior art patent, is objective evidence of nonobviousness.

PATENTS

[29] Patentability -- Composition of matter (§ 51.30)

Claim to new product is not required to include critical limitations.

PATENTS

[30] Specification -- Sufficiency of disclosure (§ 62.7)

Patents are written to enable those skilled in art to practice invention, not public, and Section 112 speaks as of application filing date, not as of time of trial.

PATENTS

[31] Specification -- Sufficiency of disclosure (§ 62.7)

Section 112 requires that inventor set forth best mode of practicing invention known to him at time application was filed.

PATENTS

[32] Claims -- Indefinite -- In general (§ 20.551)

Use of "stretching at rate exceeding specific percent per second" in claims is not indefinite.

PATENTS

[33] Claims -- Specification must support (§ 20.85)

It is claimed invention for which enablement is required.

PATENTS

[34] Specification -- Sufficiency of disclosure (§ 62.7)

Patent is not invalid merely because some experimentation is needed; patent is invalid only when those skilled in art are required to engage in undue experimentation to practice invention.

PATENTS

[35] Construction of specification and claims -- Claim defines invention (§ 22.30)

Distinguishing what infringes from what does not is role of claims, not of specification.

PATENTS

[36] Construction of specification and claims -- Defining terms (§ 22.45)

Patent applicant can be his own lexicographer.

PATENTS

[37] Defenses -- Fraud (§ 30.05)

Fraud must be shown by clear and convincing evidence; state of mind of one making representations is most important of elements to be considered in determining existence of fraud; good faith and subjective intent, while they are to be considered, should not necessarily be made controlling; under ordinary circumstances, fact of misrepresentation coupled with proof that party making it had knowledge of its falsity is enough to warrant drawing inference that there was fraudulent intent; where public policy demands complete and accurate disclosure it may suffice to show nothing more than that misrepresentations were made in atmosphere of gross negligence as to their truth.

PATENTS

[38] Pleading and practice in courts -- Issues determined -- Validity and infringement (§ 53.505)

Better practice is for district court to decide both validity and infringement issues when both are contested at trial, enabling conduct of single appeal and disposition of entire case in single appellate opinion.

PATENTS

[39] Infringement -- Tests of -- Comparison with claim (§ 39.803)

Infringement is decided with respect to each asserted claim as separate entity.

PATENTS

Particular patents -- Porous Products

3,953,566, *Gore*, Process for Producing Porous Products, holding of invalidity of claims 3 and 19 reversed and of claims 1 and 17 affirmed.

4,187,390, Gore, Porous Products and Process Therefor, holding of invalidity reversed.

***306** Appeal from District Court for the Northern District of Ohio, Manos, J.; 220 USPQ 220.

Consolidated actions by W. L. Gore & Associates, Inc., against Garlock, Inc., for patent infringement, in which defendant counterclaims for declaratory judgment of patent invalidity, noninfringement, fraudulent solicitation, and entitlement to attorney fees. From judgment for defendant, plaintiff appeals and defendant cross-appeals. Affirmed in part, reversed in part, and remanded; Davis, Circuit Judge, concurring in result in part and dissenting in part, with opinion.

David H. Pfeffer, New York, N.Y. (J. Robert Dailey and Janet Dore, both of New York, N.Y., and John S. Campbell, Newark, Del., of counsel) for appellant.

John J. Mackiewicz, Philadelphia, Pa. (Dale M. Heist, Philadelphia, Pa., on the brief, Bernard Ouziel, New York, N.Y., of counsel) for appellee.

Before Markey, Chief Judge, and Davis and Miller, Circuit Judges.

Markey, Chief Judge.

Appeal from a judgment of the District Court for the Northern District of Ohio holding U.S. Patents 3,953,566 ('566) and 4,187,390 ('390) invalid. We affirm in part, reverse in part, and remand for a determination of the infringement issue.

Background

Tape of unsintered polytetrafluorethylene (PTFE) (known by the trademark TEFLON of E.I. du Pont de Nemours, Inc.) had been stretched in small increments. W. L. Gore & Associates, Inc. (Gore), assignee of the patents in suit, experienced a tape breakage problem in the operation of its "401" tape stretching machine. Dr. Robert Gore, Vice President of Gore, developed the invention disclosed and claimed in the '566 and '390 patents in the course of his effort to solve that problem. The 401 machine was disclosed and claimed in Gore's U.S. Patent 3,664,915 ('915) and was the invention of Wilbert L. Gore, Dr. Gore's father. PTFE tape had been sold as thread seal tape, i.e., tape used to keep pipe joints from leaking. The '915 patent, the application for which was filed on October 3, 1969, makes no reference to stretch rate, at 10% per second or otherwise, or to matrix tensile strength in excess of

7,300 psi.

Dr. Gore experimented with heating and stretching of highly crystalline PTFE rods. Despite slow, careful stretching, the rods broke when stretched a relatively small amount. Conventional wisdom in the art taught that breakage could be avoided only by slowing the stretch rate or by decreasing the crystallinity. In late October 1969, Dr. Gore discovered, contrary to that teaching, that stretching the rods as fast as possible enabled him to stretch them to more than ten times their original length with no breakage. Further, though the rod was thus greatly lengthened, its diameter remained virtually unchanged throughout its length. The rapid stretching also transformed the hard, shiny rods into rods of a soft, flexible material.

Gore developed several PTFE products by rapidly stretching highly crystalline PTFE, including: (1) porous film for filters and laminates; (2) fabric laminates of PTFE film bonded to fabric to produce a remarkable material having the contradictory properties of impermeability to liquid water and permeability to water vapor, the material being used to make "breathable" rainwear and filters; (3) porous yarn for weaving and braiding into other products, like space suits and pump packing; (4) tubes used as replacements for human arteries and veins; and (5) insulation for high performance electric cables.

***307** On May 21, 1970, Gore filed the patent application that resulted in the patents in suit. The '566 patent has 24 claims directed to processes for stretching highly crystalline, unsintered, PTFE. The processes, inter alia, include the steps of stretching PTFE at a rate above 10% per second and at a temperature between about 35 degreesC and the crystalline melt point of PTFE. The '390 patent has 77 claims directed to various products obtained by processes of the '566 patent.

It is effectively undisputed that the present inventions filled a long sought yet unfilled need. The United States Army and the research director of a Garlock Inc. (Garlock) customer had been looking for and following up every remote lead to a waterproof/breathable material for many years.

It is undisputed that the present inventions enjoyed prompt and remarkable commercial success due to their merits and not to advertising or other extraneous causes.

It is undisputed that the inventions provide the most

important synthetic material available for use in vascular surgery, hundreds of thousands of persons having received artificial arteries formed of the patented products since 1976, and that the patented products have unique properties useful in other medical procedures, in communications satellites, radar systems, and electrical applications.

It is undisputed that the major sources of PTFE, ICI and du Pont, greeted the patented products as "magical," "bewitching," "a remarkable new material," and one that "differs from other processed forms of Teflon."

It is undisputed that the patented products were met with skepticism and disbelief by at least one scientist who had worked with PTFE at du Pont for many years and who testified as an expert at trial.

It is undisputed that Garlock first produced an accused product in response to a customer's request for a substitute for the patented product, that Garlock

'566 patent claims	'390 patent claims	Garlock Product
19	14, 43	film
--	36, 77	laminate
19	18	yarn
--	67	braided packing
3	--	tape

At trial, Garlock addressed only claims 1, 3, 17, and 19 of the '566 patent and claims 1, 9, 12, 14, 18, 35, 36, 43, 67 and 77 of the '390 patent. See Appendix to this opinion.

The district court, in a thorough memorandum accompanying its judgment, and in respect of the '566 patent: (1) found claim 1 anticipated under 35 U.S.C. § 102(a) by Gore's use of its 401 machine and use by the Budd Company (Budd) of a Cropper machine; (2) declared all claims of the patent invalid under 102(b) because the invention had been in public use and on sale more than one year before Gore's patent application, as evidenced by Budd's use of the Cropper machine; (3) held claims 1, 3, 17 and 19 invalid for obviousness under 35 U.S.C. §103, on the basis of various reference pairings: (a) Japanese patent 13560/67 (Sumitomo) with U.S. patent 3,214,503 (Markwood); (b) U.S. patent 2,776,465 (Smith) with Markwood; or (c) Gore's '915 patent with Sumitomo;

advertised its accused product as a "new form" of PTFE and as "a versatile new material which provides new orders of performance for consumer, industrial, medical and electrical applications," and that the customer describes that accused product as "a new dimension in rainproof/breathable fabrics."

Proceedings

On Nov. 2, 1979, Gore sued Garlock for infringement of process claims 3 and 19 of the '566 patent, and sought injunctive relief, damages and attorney fees. Garlock counterclaimed on Dec. 18, 1979, for a declaratory judgment of patent invalidity, non-infringement, fraudulent solicitation, and entitlement to attorney fees. On Feb. 7, 1980, Gore filed a second suit for infringement of product claims 14, 18, 36, 43, 67 and 77 of the '390 patent. In light of a stipulation, the district court consolidated the two suits for trial.

Gore alleged infringement of certain claims by certain products:

and (4) held all claims invalid as indefinite under 35 U.S.C. § 112. [FN1]

***308** In its opinion respecting the '390 patent, the district court held: (1) claims 1, 9, 12, 14, 18, 35, 36, 43, 67 and 77 invalid §§102 and 103 in view of Sumitomo and Smith; and (2) all claims invalid as indefinite under § 112.

The court found that Gore did not commit fraud before the Patent and Trademark Office (PTO), denied Garlock's request for attorney fees, and refrained from deciding the infringement issue.

Issues

Did the district court err in: (1) its holding of invalidity under §§102(a), 102(b), 103 and 112; (2) its finding that Gore did not commit fraud on the PTO; or (3) denying attorney fees.

Opinion

This hard fought and bitterly contested case involved over two years of discovery, five weeks of trial, the testimony of 35 witnesses (19 live, 16 by deposition), and over 300 exhibits. The district court issued an exhaustive 37- page memorandum opinion reflective of a careful, conscientious approach to the determination of the many issues presented at trial.

The record on appeal consists of 2000 pages. The parties' briefs total 199 pages. In those briefs, counsel repeatedly accuse each other of numerous and serious breaches of the duty of candor owed the court. Each cites instances in which the testimony, the findings, and the record are or are said to be quoted in part and out of context. As a result, the usefulness and reliability of the briefs as means of informing the court has been greatly diminished if not destroyed, and careful, time-consuming study of all exhibits and each page of the record has been required.

Appellant cited 80 prior court opinions in its main brief. Appellee's brief totally ignores all but two of those citations, but adds 57 more. Appellant's reply brief cites 126 prior court opinions, 34 earlier cited, 67 newly cited, and 25 of those cited by appellee. Appellee's reply brief cites 17 prior court opinions, 4 earlier cited, 7 newly cited, and 6 of the 147 cited by appellant. Accordingly, 211 prior court opinions have been evaluated in relation to the proof found in the record.

In light of the entire record and the applicable law, we are convinced that Garlock failed to carry its burden of proving all claims of the present patents invalid.

Standard of Review

[1][2] Where, as here, dispositive legal error occurred in interpretation and application of the patent statute, 35 U.S.C., the parties' arguments relating to the salutary injunction of Fed.RuleCiv.P. 52(a) cannot be controlling on all issues. Findings that "rest on an erroneous view of the law may be set aside on that basis," *Pullman-Standard v. Swint*, 456 U.S. 273 (1982). Thus it is unnecessary here to set aside any probative fact found by the district court on the basis of its being clearly erroneous, or to engage in what would be an inappropriate reweighing of the facts.

Among the legal errors extant in the record, each of which is discussed below, are (1) the invention set forth in each claim was not in each instance considered

as a whole; (2) 35 U.S.C. §102(b) was applied though criteria for its application were not present; (3) the references were not assessed in their entireties; (4) an inherency theory under §§102 and 103 was inappropriately applied; (5) that which only the inventor taught was attributed to the prior art; (6) individual steps in prior art processes dealing with materials distinct from those with which the present inventions dealt were erroneously equated to steps in the claimed processes; (7) objective evidence of nonobviousness was disregarded; and (8) the function and application of §112 were misconstrued.

Because it permeated so much of the district court's analysis, we note more fully its frequent restriction of its consideration to 10% per second rate of stretching, which it called the "thrust of the invention." That approach is repeated throughout Garlock's briefs, which refer repeatedly to the "thrust of the invention," to "the inventive concept," and to the claims "shorn of their extraneous limitations." That facile focusing on the "thrust," "concept," and "shorn" claims, resulted in treating the claims at many points as though they read differently from those actually allowed and in suit.

[3] *309 It is true that Dr. Gore emphasized rapid stretching, for example, as well as the amount of stretch and other process limitations, during prosecution of the application for the '566 patent. Yet it is the claims that measure and define the invention. *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339, 128 USPQ 354 (1961); *Bowser, Inc. v. U.S.*, 388 F.2d 346, 349, 156 USPQ 406, 409 (Ct. Cl. 1967).

[4] Each claimed invention must be considered as a whole. 35 U.S.C. § 103; *Schenck, A.G. v. Nortron Corp.*, 218 USPQ 698, 700 (Fed. Cir. 1983). In determining obviousness, there is "no legally recognizable or protected 'essential,' 'gist,' or 'heart' of the invention." *Aro*, 365 U.S. at 345. A court's restriction of a claimed multi-step process to one step constitutes error, whether done at the behest of a patentee relying on that restriction to establish infringement by one who employs only that one step in a process otherwise distinct, or at the behest of an accused infringer relying on that restriction to establish invalidity by showing that one step in a prior art process otherwise distinct.

(1) Invalidity

(a) '566 Patent

(i) §102(a) and The 401 Machine

It is undisputed that the district court held only claim 1 of the '566 patent to have been anticipated under § 102(a) by operation of the 401 machine in the Gore shop before Dr. Gore's invention in late October 1969. It did so on the deposition testimony of two former Gore employees, documents, and drawings of the 401 machine.

In August 1969, Gore offered to sell to Export Tool Company (Export) tape "to be made" on the 401 machine. Tape made on the 401 machine was shipped to Export on October 24, 1969. The trial judge found the rolls on the 401 machine were, at least at some point in time before October 1969, spaced less than four feet apart and that the rate of stretch accomplished in operating that machine (admittedly operated in accord with the description of machine operation in the '915 patent) must have been greater than 10% per second. The district court credited testimony that Teflon 6-c, a highly crystalline form of Teflon, was used because it was the standard resin at the time, and that the tape was stretched at a temperature above 35 degreesC. Thus it cannot be said that the record fails to support the district court's finding that the limitations of claim 1 were met by Gore's operation of the 401 machine before Dr. Gore's asserted "late October 1969" date of invention. Though he was working with the operation of the 401 machine, Dr. Gore offered no proof that his invention date was before the date of shipment to Export.

[5] Gore, seeking a review here of the evidence, points to certain inadequacies as indicating a failure to meet the required clear and convincing standard under §102(a). At the time of trial, the district court, bound by precedent then applicable, applied a preponderance of the evidence test. Gore asserts, erroneously, that the clearly erroneous standard does not therefore apply on this appeal. Gore does not, however, point to any basis on which the district court's findings must be held to have been clearly erroneous under the clear and convincing standard. We are not at liberty, of course, to substitute our own for the district court's findings underlying its conclusion that claim 1 is invalid.

[6] Gore's operation of the 401 machine must thus be viewed as a consistent, reproducible use of Dr. Gore's invention as set forth in claim 1, and it is therefore irrelevant that those using the invention may not have appreciated the results. *General Electric Co. v. Jewel Incandescent Lamp Co.*, 326

U.S. 242, 248, 67 USPQ 155, 157-58 (1945). Were that alone enough to prevent anticipation, it would be possible to obtain a patent for an old and unchanged process. *Ansonia Brass & Copper Co. v. Electric Supply Co.*, 144 U.S. 11, 18 (1892); see, *H.K. Regar & Sons, Inc. v. Scott & Williams, Inc.*, 63 F.2d 229, 231, 17 USPQ 81, 83 (2d Cir. 1933).

[7] The nonsecret use of a claimed process in the usual course of producing articles for commercial purposes is a public use. *Electric Storage Battery Co. v. Shimadzu*, 307 U.S. 5, 20, 41 USPQ 155, 161 (1939), and there was no evidence that any different process was used to produce the articles shipped to Export.

Thus it cannot be said that the district court erred in determining that the invention set forth in claim 1 of '566 patent was known or used by others under §102(a), as evidenced by Gore's operation of the 401 machine before Dr. Gore's asserted date of that invention.

In view of our affirmance of the judgment reached on claim 1 under 102(a), we need not discuss other asserted grounds of invalidity of claim 1. There was, however, no evidence whatever that the inventions set forth in other claims, of either the '566 or the '390 patent, were known or used by others as a result of Gore's operation of the 401 machine before late October 1969.

*310 (ii) §102(b) and the Cropper Machine

In 1966 John W. Cropper (Cropper) of New Zealand developed and constructed a machine for producing stretched and unstretched PTFE thread seal tape. In 1967, Cropper sent a letter to a company in Massachusetts, offering to sell his machine, describing its operation, and enclosing a photo. Nothing came of that letter. There is no evidence and no finding that the present inventions thereby became known or used in this country.

In 1968, Cropper sold his machine to Budd, which at some point thereafter used it to produce and sell PTFE thread seal tape. The sales agreement between Cropper and Budd provided:

ARTICLE "E" - PROTECTION OF TRADE
SECRETS Etc.

1. BUDD agrees that while this agreement is in force it will not reproduce any copies of the said apparatus without the express written permission of Cropper nor will it divulge to any person or

persons other than its own employees or employees of its affiliated corporations any of the said known-how or any details whatsoever relating to the apparatus.

2. *BUDD* agrees to take all proper steps to ensure that its employees observe the terms of Article "E" 1 and further agrees that whenever it is proper to do so it will take legal action in a Court of competent jurisdiction to enforce any one or more of the legal or equitable remedies available to a trade secret plaintiff.

Budd told its employees the Cropper machine was confidential and required them to sign confidentiality agreements. Budd otherwise treated the Cropper machine like its other manufacturing equipment.

A former Budd employee said Budd made no effort to keep the secret. That Budd did not keep the machine hidden from employees legally bound to keep their knowledge confidential does not evidence a failure to maintain the secret. Similarly, that du Pont employees were shown the machine to see if they could help increase its speed does not itself establish a breach of the secrecy agreement. There is no evidence of when that viewing occurred. There is no evidence that a viewer of the machine could thereby learn anything of which process, among all possible processes, the machine is being used to practice. As Cropper testified, looking at the machine in operation does not reveal whether it is stretching, and if so, at what speed. Nor does looking disclose whether the crystallinity and temperature elements of the invention set forth in the claims are involved. There is no evidence that Budd's secret use of the Cropper machine made knowledge of the claimed process accessible to the public.

The district court held all claims of the '566 patent invalid under 102(b), *supra*, note 3, because "the invention" was "in public use [and] on sale" by Budd more than one year before Gore's application for patent. Beyond a failure to consider each of the claims independently, 35 U.S.C. §282; *Altoona Publix Theatres, Inc. v. American Tri-Ergon Corp.*, 294 U.S. 477, 487, 24 USPQ 308 (1935), and a failure of proof that the claimed inventions as a whole were practiced by Budd before the critical May 21, 1969 date, it was error to hold that Budd's activity with the Cropper machine, as above indicated, was a "public" use of the processes claimed in the '566 patent, that activity having been secret, not public.

Assuming, *arguendo*, that Budd sold tape produced

on the Cropper machine before October 1969, and that that tape was made by a process set forth in a claim of the '566 patent, the issue under §102(b) is whether that sale would defeat Dr. Gore's right to a patent on the process inventions set forth in the claims.

[8] If Budd offered and sold anything, it was only tape, not whatever process was used in producing it. Neither party contends, and there was no evidence, that the public could learn the claimed process by examining the tape. If Budd and Cropper commercialized the tape, that could result in a forfeiture of a patent granted them for their process on an application filed by them more than a year later. *D.L. Auld Co. v. Chroma Graphics Corp.*, No. 83-585, slip op. at 5-6 (Fed. Cir. Aug. 15, 1983); See *Metalizing Engineering Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 68 USPQ 54 (2d Cir. 1946). There is no reason or statutory basis, however, on which Budd's and Cropper's secret commercialization of a process, if established, could be held a bar to the grant of a patent to Gore on that process.

[9][10] Early public disclosure is a linchpin of the patent system. As between a prior inventor who benefits from a process by selling its product but suppresses, conceals, or otherwise keeps the process from the public, and a later inventor who promptly files a patent application from which the public will gain a disclosure of the process, the law favors the latter. See *Horwath v. Lee*, 564 F.2d 948, 195 USPQ 701 (CCPA 1977). The district court therefore erred as a matter of law in applying the statute and in its determination that Budd's secret use of the Cropper machine and sale of tape rendered all process *311 claims of the '566 patent invalid under §102(b).

(iii) §103

In considering claims 1, 3, 17, and 19 of the '566 patent, the district court recognized that analysis of the obviousness issue under §103 requires determination of the scope and content of the prior art, the differences between the prior art, and the claims at issue, and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

[11][12][13] In its consideration of the prior art, however, the district court erred in not taking into account the import of the markedly different behavior of PTFE from that of conventional thermoplastic polymers clearly established and

undisputed on the record, and in thus disregarding the unpredictability and unique nature of the unsintered PTFE to which the claimed inventions relate, *In re Whiton*, 420 F.2d 1082, 164 USPQ 455 (CCPA 1970); in considering claims in less than their entirety, *Schenck*, supra; and in considering the references in less than their entirety, i.e., in disregarding disclosures in the references that diverge from and teach away from the invention at hand. *In re Kuderna*, 426 F.2d 385, 165 USPQ 575 (CCPA 1970).

Invalidity of claim 1 under §102(a) having been determined, it is unnecessary to discuss in detail the applicability of §103 to that claim. If claim 1 had not been held anticipated under §102(a) in light of operation of the 401 machine, it is clear from the discussion here that claim 1 could not properly have been held invalid under §103.

Claim 3 depends from and thus incorporates claim 1 but specifies a rate of stretch of 100% per second. Claim 17 also depends from claim 1 and specifies an amount of stretch of about twice the original length. Claim 19 depends from claim 17 but specifies an amount of stretch of about five times the original length.

U.S. patent 2,983,961 to Titterton, Volume 13 of the *Encyclopedia of Polymer Science and Technology* (1970), the Sumitomo patent, and witnesses for both parties, establish that teachings related to conventional thermoplastic polymers are inapplicable to PTFE.

Articles by Dogliotti and Yelland, *Effect of Strain Rate on the Viscoelastic Properties of High Polymeric Fibrous Materials*, 4 *High Speed Testing* 211 (1964) and Robinson and Graham, *Methods of Characterization of Polymeric Materials by High Speed Testing Techniques*, 5 *High Speed Testing* 261 (1965), teach that conventional plastics and sintered PTFE can be stretched further if stretched slowly. Dr. Gore demonstrated at trial and at oral argument before us that an attempt to stretch highly crystalline, unsintered PTFE slowly results in breakage, and that rapid stretching produces a greatly lengthened rod of soft, flexible material.

The '566 patent contains an example of stretching an article to 16 times its length. Smith and the '915 patent teach that PTFE could not be stretched beyond four times its length without heating it to above its crystalline melt temperature, a step avoided by Dr. Gore and as set forth in the claims.

Sumitomo teaches that there is a length limit to stretching unsintered PTFE, and does not suggest what that limit might be. Markwood, U.S. patent 3,208,100 to Nash (Nash), and U.S. patent 2,823,421 to Scarlett (Scarlett) teach that *non-PTFE* thermoplastics can be stretched rapidly and to extended lengths, and *also* teach reduction, elimination, or avoidance of crystallinity before stretching.

The disclosure in the Smith and '915 patents that a PTFE article may be stretched to as much as four times its length encompasses the step of stretching to twice its length set forth in claim 17 and establishes that such step would have been obvious.

[14] Claims 3 and 19 must be considered individually and separately. 35 U.S.C. §282. Nowhere, in any of the references, is it taught or suggested that highly crystalline, unsintered PTFE could be stretched at a rate of about 100 per second as required by asserted claim 3. Nor is it anywhere suggested that by rapid stretching a PTFE article be stretched to more than five times its original length as required by asserted claim 19. On the contrary, the art as a whole teaches the other way.

[15] In concluding that obviousness was established by the teachings in various pairs of references, the district court lost sight of the principle that there must have been something present in those teachings to suggest to one skilled in the art that the claimed invention before the court would have been obvious. *In re Bergel*, 292 F.2d 955, 956-57, 130 USPQ 206, 208 (CCPA 1961); *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 244 (CCPA 1969).

The court's pairing of Sumitomo and Markwood disregarded, as above indicated, the undisputed evidence that the unsintered PTFE of Sumitomo does not respond to the conventional plastics processing of Markwood and the art recognition of that fact. *Whiton*, supra, 420 F.2d at 1085, 164 USPQ at 457.

In evaluating claim 19, for example, the pairing disregarded Sumitomo's limited *312 length of stretch teaching. In evaluating claim 3, the court recognized that Sumitomo made no mention of rate of stretch. Looking to Markwood to supply that teaching disregarded not only the conventional plastics-unsintered PTFE distinction but also the clear divergence of Markwood's teaching that crystallinity must be reduced or avoided from the presence of "highly crystalline" in all claims of the '566 patent.

Similarly, and for many of the same reasons, the pairing of Markwood's and Smith's teachings was an inappropriate basis for concluding that the processes set forth in claims 3 and 19 would have been obvious. As above indicated, Markwood's rapid stretching of conventional plastic polypropylene with reduced crystallinity would not suggest rapid stretching of highly crystalline PTFE, in light of teachings in the art that PTFE should be stretched slowly. The Smith patent is owned by du Pont, where Dr. Gore's process invention was considered to have produced a "remarkable new material." That circumstance is not surprising, for Smith, though dealing with PTFE, says not a word about any rate of stretch.

Lastly, the pairing of Sumitomo and the '915 patent suffers from the same shortcomings. The pairing resulted from a hypothetical set forth in Garlock's post trial brief, and was based on no testimony or other evidence in the record. In respect to claim 3, neither reference mentions rate of stretch or suggests its importance. In respect of claim 19 both references point away from the claimed invention in their limited length-of-stretch teachings. The '915 patent states: "the 65 percent expanded material could be expanded a second time for an additional 65 percent expansion or a total length increase ratio of 1:2.72 [less than three times the original length]. However, great care was necessary to obtain a uniformly expanded material at these very great expansion ratios." Thus the '915 patent suggests that the amount of stretch of 500% set forth in claim 19 (more than five times the original length) is not possible.

As indicated, Sumitomo and Smith are totally silent respecting the rate of stretch, and there is simply no teaching in the art that would suggest to one of ordinary skill that Markwood's fast stretching of other thermoplastics could or should be employed in the process of treating PTFE taught by either Sumitomo or Smith. Indeed, Smith not only says nothing about rate of stretch, its preferred teaching is away from other elements of the inventions set forth in claims 3 and 19. Smith discloses that stretching should be done after the PTFE is heated above its crystalline melting point and with decreased crystallinity. Smith teaches:

Below about 300 degreesC it is *not possible* to draw more than about 4X [times] and while such draw ratios can be attained around 300 degreesC and below the polymer's crystalline melting point with resultant orientation and improved properties it is preferred to use temperatures at or above the polymer's crystalline melting point. (Emphasis

added).

Nash teaches that the film should be plasticized, i.e., made more viscous, before stretching. Contrary to that teaching, Dr. Gore did not reduce crystallinity before increasing the rate of stretch, but maintained the unsintered PTFE "highly crystalline" while stretching at a 100% per second rate and to more than five times, as set forth respectively in claims 3 and 19.

[16] On the entire record and in view of all the references, each in its entirety, it is clear that a person of ordinary skill confronted with a PTFE tape breakage problem would have either slowed the rate of stretching or increased the temperature to decrease the crystallinity. Dr. Gore did neither. He proceeded contrary to the accepted wisdom of the prior art by dramatically increasing the rate and length of stretch *and* retaining crystallinity. That fact is strong evidence of nonobviousness. *United States v. Adams*, 383 U.S. 39 (1966).

Having learned the details of Dr. Gore's invention, the district court found it within the skill of the art to stretch other material rapidly (Markwood); to stretch PTFE to increase porosity (Sumitomo); and to stretch at high temperatures (Smith). The result is that the claims were used as a frame, and individual, naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention. At no point did the district court, nor does Garlock, explain why that mosaic would have been obvious to one skilled in the art in 1969, or what there was in the prior art that would have caused those skilled in the art to disregard the teachings there found against making just such a mosaic. On the contrary, the references and the uncontested testimony, as above indicated, established that PTFE is *sui generis*. It is not surprising, therefore, that, unlike the situation in *Stratoflex, Inc. v. Aeroquip Corp.*, 218 USPQ 871 (Fed. Cir. 1983), there was no testimony and no finding that one skilled in the art would transfer conventional thermoplastic processes to those for unsintered PTFE, or would have been able to predict what would happen if they did.

[17] To imbue one of ordinary skill in the art with knowledge of the invention in suit, *313 when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

(Cite as: 220 U.S.P.Q. 303, *313)

[18] It is difficult but necessary that the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art. Had that been here done the inventions set forth in the claims 3 and 19 of the '566 patent could only have been held non-obvious to those skilled in the art at the time those claimed inventions were made.

[19] Error in visualizing the burden of proof on obviousness may have contributed to the court's application here of the prior art. Adopting the phrase from earlier precedents, the court said "the presumption [of validity] is weakened greatly where the Patent Office has failed to consider pertinent prior art." That is not the law of established precedent in this court. *SSIH Equipment S.A. v. ITC*, 218 USPQ 678, 687 (Fed. Cir. 1983); *Solder Removal Co. v. ITC*, 582 F.2d 628, 633, 199 USPQ 129, 133, n. 9 (CCPA 1978). The presumption has no separate evidentiary value. It cautions the decisionmaker against a rush to conclude invalidity. Submission of additional art that is merely "pertinent" does not dispel that caution. It is difficult to imagine a patent law suit in which an accused infringer is unable to add some new "pertinent" art. The inescapable burden of persuasion on one who would prove invalidity, however, remains throughout the trial. 35 U.S.C. §282.

[20] The burden of proving invalidity may of course be facilitated by prior art that is *more pertinent* than that considered by the PTO. That did not happen here. In the present case, Sumitomo, Smith, and the '915 patent were among references considered by the PTO. Other references referred to as not considered were merely cumulative, disclosing nothing not disclosed in references that were considered by the PTO. The Canadian counterpart of Nash was considered by the PTO. The relevant disclosures of Markwood appear in Sandiford patent 3,544,671 and Paratheon patent 3,637,906, both considered by the PTO. The Russian Author's Certificate 240,997, assuming its status as prior art and whatever the material with which it dealt, contributed nothing beyond the teachings of the '915 patent considered by the PTO.

[21] As discussed more fully below, the district court erred in specifically declining to consider the

objective evidence of nonobviousness. In *re Sernaker*, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed. Cir. 1983). That evidence can often serve as insurance against the insidious attraction of the siren hindsight when confronted with a difficult task of evaluating the prior art. Though the prior art evidence here pointed more in the direction of nonobviousness than obviousness, the objective evidence may tend, as it did in *Sernaker*, supra, to reassure the decisionmaker.

In sum, the district court erred as a matter of law on this record in concluding that Garlock had met its burden of proving that the inventions of claims 3 and 19 of the '566 patent would have been obvious.

(b) '390 patent

(i) §102

The district court found product claims 1, 9, 12, 14, 18 and 43 inherently anticipated because it found that the microstructure of nodes interconnected by fibrils is an inherent characteristic of paste-extruded PTFE products resulting from the process disclosed in Smith. The court found the first four of those claims and claim 43, plus claims 35, 36, 67 and 77 inherently anticipated because high strength PTFE products are inherent in the examples of Sumitomo.

The teachings of Smith include neither a disclosure nor a suggestion of "porous" products having a "microstructure characterized by nodes interconnected by fibrils" as required by the claims found to have been anticipated by Smith.

The teachings of Sumitomo do not include a disclosure of products having "a matrix tensile strength * * * above about 7,300 psi" as required by the claims found to have been anticipated by Sumitomo.

[22] Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *Soundscriber Corp. v. U.S.*, 360 F.2d 954, 960, 148 USPQ 298, 301, adopted, 149 USPQ 640 (Ct. Cl. 1966). Neither Smith nor Sumitomo disclose an invention set forth in any claim of the '390 patent.

The incongruity in findings that the different processes of Smith and Sumitomo each inherently produced identical products is striking.

Garlock attempted with expert testimony to overcome

the prior art shortcomings as proof of anticipation. Gore rebutted with its own expert testimony. It is unnecessary, however, to resolve apparent conflicts in the divergent testimony, much if not all of which took *314 the form of pure unsupported assertion. No inter partes tests in which the Smith and Sumitomo processes were conducted are of record. No products of those processes were placed in evidence, and there was, of course, no analysis of any such evidentiary products.

Nor is it necessary to evaluate the inappropriate disparagement in Garlock's brief of Dr. Sperati as a "friend" of Gore.

[23] Given the unique nature of unsintered PTFE, we are not persuaded that the "effect" of the processes disclosed in Smith and Sumitomo, an "effect" undisclosed in those patents, would be always to inherently produce or be seen always to produce products meeting all of the claim limitations. Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references. In re Felton, 484 F.2d 495, 500, 179 USPQ 295, 298 (CCPA 1973). It is clear that the teachings of neither Smith nor Sumitomo place the products claimed in the '390 patent in possession of the public.

The teachings of Smith and Sumitomo are so unacceptably vague concerning characteristics of products produced by their respective processes as not to support an anticipation rejection. That fact is confirmed by the PTO's having fully considered those references and by its having issued the '390 patent over them.

[24] Garlock's assertion that it employs a process covered by the Smith patent, if true, is irrelevant. The '390 patent was allowed over Smith as a reference. Assuming Smith is a dominating patent, the rule of law is clear that an accused infringer's employment of the process of a dominating patent does not render that employment an anticipation of an invention described and claimed in an improvement patent. As indicated, there is no present record basis for finding that the Smith process in itself necessarily and inherently results in the products, each considered in its entirety, in the claims of the '390 patent. The testimony of Garlock's expert about ex parte tests, the records of which he destroyed before trial, cannot serve as such a basis. The effusive praise of Dr. Gore's claimed products by the owner of the Smith

patented process would appear, on the contrary, to confirm the action of the PTO in issuing the '390 patent.

Garlock has not met its burden of showing that claims 1, 9, 12, 14, 18, and 43 are anticipated by Smith or that claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 are anticipated by Sumitomo.

(ii) §103

[25] The scope and content of the prior art and level of ordinary skill, discussed above in relation to the '566 patent, would be the same for the '390 patent. The district court did not, however, nor does Garlock, apply the Graham criteria, supra, to the '390 claims, apparently assuming that the claimed products, having been found inherent in the processes of Sumitomo and Smith, would have been obvious in view of those references. If so, that was error. Inherency and obviousness are distinct concepts. In re Spormann, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966).

In discussing inherency the district court did recognize differences between Smith's disclosure and the inventions set forth in claims 1, 9, 12, 14, 18, and 43, i.e., the absence from Smith of a description of the products of Smith's process as porous and the absence from Smith of a disclosure that those products have a microstructure characterized by nodes interconnected by fibrils.

Similarly, a difference between Sumitomo's disclosure and the inventions set forth in claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 was recognized in the absence from Sumitomo of a quantification of the matrix tensile strengths of the products of Sumitomo's process. The district court also discussed differences between the dependent claims and the prior art. Because we conclude that the independent claims of the '390 patent are patentable over the art of record, we need not discuss the dependent claims.

[26] Having determined that the invention would have been obvious in view of the process of either Smith or Sumitomo, the district court did not discuss the strong showing of objective evidence of nonobviousness here present, saying with respect to one part of such evidence, "no amount of commercial success can save it." That approach was error. All evidence bearing on the issue of obviousness, as with any other issue raised in the conduct of the judicial process, must be considered and evaluated *before* the required legal conclusion is reached. Stratoflex,

supra, 218 USPQ at 879.

[27] The objective evidence of nonobviousness, i.e., the "indicia" of Graham, supra, may in a given case be entitled to more weight or less, depending on its nature and its relationship to the merits of the invention. It may be the most pertinent, probative, and revealing evidence available to aid in reaching a conclusion on the obvious/nonobvious issue. It should when present always be considered as an integral part of the analysis.

Gore's fabric laminates, for example, as set forth in claims 36 and 77, satisfied a long-felt *315 need for a material having the contradictory properties of being simultaneously breathable (allowing water vapor or perspiration to pass) and waterproof. The record establishes that such a material had long been sought by makers of rainwear and outerwear, and by the U.S. Army as well. That Gore's fabric laminates filled that need is attested by the rise in their annual dollar sales from zero to seven million in the first five years of their availability.

Gore's PTFE tubes for replacement of human arteries and veins, also satisfied a long-felt need. The uncontradicted evidence establishes that Gore's PTFE tubes hold blood without leaking, need not be pre-clotted with the patient's blood, are chemically inert, and, being breathable, are less likely to cause an air embolism. The value and uniqueness of those four properties make Gore's PTFE tubes, as described in unchallenged testimony, "the most important synthetic material presently existing" in vascular surgery, and, along with other evidence in the record, reflect the intended working of the patent system.

As discussed above, current annual sales of over sixty million dollars are attributable to the merits of the products claimed in the '390 patent. Considering the long-felt need for those products and the obvious commercial advantage to be gained by meeting that need, it is reasonable to conclude that the claimed products of the '390 patent would not have been obvious to persons of ordinary skill in the art at the time the claimed inventions were made.

[28] As above indicated, the praise which greeted the products claimed in the '390 patent from PTFE suppliers, including the owner of the Smith patent, is further objective evidence of nonobviousness.

[29] Garlock's appeal argument that the '390 claims are invalid because the recited minimum matrix

tensile strengths are not "critical" is without merit. A claim to a new product is not legally required to include critical limitations. In re Miller, 441 F.2d 689, 696, 169 USPQ 597, 602 (CCPA 1971). The '390 claims are not drawn to optimization of ingredients or ranges within broad prior art teachings, but to new porous PTFE products of particular characteristics.

In sum, and in view of the difficulty of working with unsintered PTFE and its unpredictable response to various processing techniques, the vagueness of Smith and Sumitomo concerning the products produced by those processes, the filling of at least two long-felt needs and the commercial success described above, we conclude that the inventions set forth in claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent would not have been obvious to those skilled in the art at the time those inventions were made.

(c) §112 and the '566 and '390 patents

The patents in suit resulted from a single application and thus have substantially identical specifications. The holding of invalidity on the basis of §112 is common to both patents.

The district court found that the patents did not disclose sufficient information to enable a person of ordinary skill in the art to make and use the invention, as required by §112, first paragraph, and that certain claim language was indefinite, presumably in light of § 112, second paragraph, because: (1) there was no definition in the specification of "stretch rate," different formulae for computing stretch rate having been developed and presented at trial; (2) there was no way taught in the specification to calculate the minimum rate of stretch above 35 degreesC; (3) the phrase "matrix tensile strength" is indefinite; and (4) the phrase "specific gravity of the solid polymer" is indefinite.

[30] The findings rest on a misinterpretation of §112, its function and purpose. The district court considered whether certain terms would have been enabling to the public and looked to formula developments and publications occurring well after Dr. Gore's filing date in reaching its conclusions under § 112. Patents, however, are written to enable those skilled in the art to practice the invention, not the public. In re Storrs, 245 F.2d 474, 478, 114 USPQ 293, 296-97 (CCPA 1957), and §112 speaks as of the application filing date, not as of the time of trial. In re Mott, 539 F.2d 1291, 1296, 190 USPQ

536, 541 (CCPA 1976). There was no evidence and no finding that those skilled in the art would have found the specification non-enabling or the claim language indefinite on May 21, 1970, when the application which resulted in issuance of Dr. Gore's patents was filed. Indeed, the expert quoted by the district court and whose testimony was primarily relied upon respecting formulae, was still in school at that time.

There is uncontradicted evidence in the record that at the time the application was filed "stretch rate" meant to those skilled in the art the percent of stretch divided by the time of stretching, and that the latter was measurable, for example, with a stopwatch. Concern for the absence from the specification of a formula for calculating stretch rate is therefore misplaced, and the post-filing date development of varying formulae, including Dr. Gore's later addition of a formula in his corresponding Japanese patent, is irrelevant.

[31] *316 Section 112 requires that the inventor set forth the best mode of practicing the invention known to him at the time the application was filed. Calculating stretch rate at that time was accomplished by actually measuring the time required to stretch the PTFE material. That was the only mode then used by the inventor, and it worked. The record establishes that calculation by that mode would have been employed by those of ordinary skill in the art at the time the application was filed. As indicated, Dr. Gore's disclosure must be examined for §112 compliance in light of knowledge extant in the art on his application filing date.

[32] The district court, though discussing enablement, spoke also of indefiniteness of "stretch rate," a matter having to do with §112, second paragraph, and relevant in assessment of infringement. The use of "stretching * * * at a rate exceeding about 10% per second" in the claims is not indefinite. Infringement is clearly assessable through use of a stopwatch. No witness said that could not be done. As above indicated, subsequently developed and therefore irrelevant formulae cannot be used to render non-enabling or indefinite that which was enabling and definite at the time the application was filed.

[33] Similarly, absence from the specification of a method for calculating the minimum rate of stretch above 35 degreesC does not render the specification non-enabling. The specification discloses that "[t]he lower limit of expansion rates interact with

temperature in a roughly logarithmic fashion, being much higher at higher temperatures." Calculation of minimum stretch rate above 35 degreesC is nowhere in the claims, and it is the *claimed* invention for which enablement is required. The claims require stretching at a rate greater than 10% per second at temperatures between 35 degreesC and the crystalline melt point of unsintered PTFE. That the minimum rate of stretch may increase with temperature does not render non-enabling Dr. Gore's specification, particularly in the absence of convincing evidence that those skilled in the art would have found it non-enabling at the time the application was filed.

[34] The district court invalidated both patents for indefiniteness because of its view that some "trial and error" would be needed to determine the "lower limits" of stretch rate above 10% per second at various temperatures above 35 degreesC. That was error. Assuming some experimentation were needed, a patent is not invalid because of a need for experimentation. *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261, 270-71 (1916). A patent is invalid only when those skilled in the art are required to engage in *undue* experimentation to practice the invention. *In re Angstadt*, 537 F.2d 498, 503-04, 190 USPQ 214, 218 (CCPA 1976). There was no evidence and the court made no finding that undue experimentation was required.

[35] Moreover, the finding here rested on confusion of the role of the specification with that of the claims. The court found that the specification's failure to state the lower limit of stretch rate (albeit above 10% per second) at each degree of temperature above 35 degreesC (a requirement for at least hundreds of entries in the specification) did not "distinguish processes performed above the 'lower limit' from those performed below the 'lower limit'." The claims of the '390 patent say nothing of processes and lower limits. Distinguishing what infringes from what doesn't is the role of the claims, not of the specification. It is clear that the specification is enabling, *In re Storrs*, *supra*, and that the claims of both patents are precise within the requirements of the law. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971).

[36] The finding that "matrix tensile strength" is indefinite, like the other findings under §112, appears to rest on a confusion concerning the roles of the claims and the specification. While finding "matrix tensile strength" in the claims indefinite, the

district court at the same time recognized that the specification itself disclosed how to compute matrix tensile strength, in stating "to compute matrix tensile strength of a porous specimen, one divides the maximum force required to break the sample by the cross sectional area of the porous sample, and then multiplies this quantity by the ratio of the specific gravity of the solid polymer divided by the specific gravity of the porous specimen." Further, the specification provided the actual matrix tensile strength in several examples. It is well settled that a patent applicant may be his own lexicographer. In light of the disclosure of its calculation in the specification, we cannot agree that "matrix tensile strength" is either indefinite or non-enabling.

Nor does absence from the specification of a definition for "specific gravity of the solid polymer," a part of the computation of matrix tensile strength, render that computation indefinite. It is undisputed that in the many examples in the application the specific gravity values used for unsintered and sintered PTFE were 2.3 and 2.2, respectively. There was no testimony that those values were not known to persons of ordinary skill in the art or could not be calculated or measured. There is simply no support for the conclusion that "specific gravity of the solid polymer" is indefinite or that absence of its definition renders *317 the specification non-enabling. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

We conclude that Garlock has failed to prove that at the time the application was filed, the specification was not enabling or that the claims were indefinite within the meaning of §112.

(2) *Fraud*

[37] Fraud must be shown by clear and convincing evidence. *Norton v. Curtiss*, 433 F.2d 779, 797, 167 USPQ 532, 546-47 (CCPA 1970).

The state of mind of the one making the representations is probably the most important of the elements to be considered in determining the existence of "fraud." * * * Good faith and subjective intent, while they are to be considered, should not *necessarily* be made controlling. Under ordinary circumstances, the *fact* of misrepresentation coupled with proof that the party making it had knowledge of its falsity is enough to warrant drawing the inference that there was a fraudulent intent. Where public policy demands a complete and accurate disclosure it may suffice to show nothing more than that the misrepresentations

were made in an atmosphere of gross negligence as to their truth. [emphasis in original].

Norton, 433 F.2d at 795-96; 167 USPQ at 545; see, *Miller*, *Fraud on the PTO*, 58 JPOS 271 (1976).

Garlock alleges fraud in Gore's representations that stretching PTFE tape at a rate greater than 10% per second was novel and that it produces a physical phenomenon. The district court found the evidence insufficient to establish that Gore had a specific intent to defraud the PTO. No basis exists for our overturning that finding. Accordingly, we agree with the district court that Garlock has failed to sustain its heavy burden of proving, by clear and convincing evidence, sufficient facts from which fraudulent intent can be inferred.

Garlock points to a September 4, 1975, Gore affidavit filed in the PTO that stated:

2. Prior to my invention disclosed in the captioned patent application, during production of expanded PTFE products by W. L. Gore & Associates, Inc., the rate of stretching was neither measured nor controlled and to my knowledge did *not* involve stretching of unsintered PTFE at a rate exceeding about 10% per second. (emphasis in original)

No finding of the district court and no evidence of record establishes that that statement was made in reckless disregard of facts from which an intent to defraud may be inferred.

The district court's finding in 1982 that the 401 machine inherently stretched tape at some time in 1969 at a rate more than 10% per second, does not establish that Dr. Gore was aware of that fact in 1975, nor does it make untrue his statement that to his knowledge that had not been the rate of stretch employed. Nor does the district court's finding conflict with Dr. Gore's statement that the rate of stretching was neither measured nor controlled in the Gore shop before his invention of the claimed process as a whole.

Nor does the evidence of isolated statements support Garlock's contention that Dr. Gore attempted to convince the PTO that a physical phenomenon always existed in which stretching at a rate greater than 10% per second always produced a matrix tensile strength greater than 7300 psi. On the contrary, Dr. Gore set forth in his specification examples indicating that some samples broke, ruptured, or disintegrated.

(3) *Attorney's Fees*

The district court did not abuse its discretion in denying Garlock its request for attorney fees.

Infringement

[38] Where, as here, an appellate court reverses a holding of invalidity, and remand is ordered for trial of the factual issue of infringement, an inefficient use of judicial resources results if the second judgment is appealed. The better practice would therefore be for the district court to decide both the validity and infringement issues when both are contested at the trial, enabling the conduct of a single appeal and disposition of the entire case in a single appellate opinion.

Resolution of the infringement issue at trial may also overlap with resolution of the validity issue, where, for example, the claimed invention was or was not copied by the validity challenger, or the challenger substituted the claimed invention for freely available prior art processes or products, *Eibel*, supra, 261 U.S. at 56, or an assertion of nonenablement may conflict with the ease with which the accused infringer may be shown to have practiced the invention as taught in the patent. *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 61 (1923).

[39] The district court having declined to decide the infringement issue, *Gore* suggests that the record here is sufficient to warrant *318 our deciding it now. With reluctance in view of the length and bitter nature of the present litigation, we decline the suggestion. In so doing, we imply nothing of our view on the issue. Nor do we intend any implication that the district court could not itself determine the infringement issue on the present record. Infringement of particular claims of two patents was asserted. None of those claims has been finally held invalid. Assuming their continued assertion, infringement must be decided with respect to each asserted claim as a separate entity. *Altoona*, supra, 294 U.S. at 487. Those factual determinations should be made in the first instance by the district court.

Decision

The holdings of invalidity of claim 1 of the '566 patent under §102(a) and of claim 17 of the '566 patent under §103, the determination that *Gore* did not commit fraud on the PTO, and the denial of attorney fees, are affirmed; the holdings that all claims of the '566 patent are invalid under §102(b), that claims 3 and

19 of the '566 patent are invalid under §103, and that all claims of the '566 patent are invalid under §112, are reversed. The holdings that claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent are invalid under §§102 and 103, and that all claims of the '390 patent are invalid under § 112, are reversed. The case is remanded for determination of the infringement issue.

Affirmed in part, reversed in part, and remanded.

APPENDIX

Appendix

Claims of the '566 patent discussed at trial:

1. A process for the production of a porous article of manufacture of a polymer of tetrafluoroethylene which process comprises expanding a shaped article consisting essentially of highly crystalline poly (tetrafluoroethylene) made by a paste-forming extrusion technique, after removal of lubricant, by stretching said unsintered shaped article at a rate exceeding about 10% per second and maintaining said shaped article at a temperature between about 35 degreesC. and the crystalline melt point of said tetrafluoroethylene polymer during said stretching.

3. The process of claim 1 in which the rate of stretch is about 100% per second.

17. The process of claim 1 in which the shaped article is expanded such that its final length in the direction of expansion is greater than about twice the original length.

19. The process of claim 17 in which said final length is greater than about five times the original length.

Claims of '390 patent discussed at trial:

1. A porous material consisting essentially of highly crystalline polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 73,00 psi.

9. A porous material consisting essentially of polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above 9290 psi, which material has been heated to a temperature

above the crystalline melt point of said polymer and has a crystallinity below about 95%.

12. A porous material in accordance with claim 9 which is in the form of a shaped article.

14. A product in accordance with claim 12 which is in the form of a film.

18. A product in accordance with claim 12 which is in the form of continuous filaments.

35. A laminated structure comprising (a) a first shaped article formed of a porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 7,300 psi, and (b) a second shaped article bonded to said first shaped article.

36. The structure of claim 35 in which said first shaped article is formed of a porous material which has a matrix tensile strength in at least one direction of at least 9290 psi, and has a crystallinity below about 95%.

43. A porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils, which material (a) has a matrix tensile strength in at least one direction above about 9290 psi, (b) has been heated to a temperature above 327 degrees C. and has a crystallinity below about 95%, and (c) has a dielectric constant of 1.2-1.8.

67. An impregnated structure comprising

(a) a shaped article formed of a porous material made of a tetrafluoroethylenepolymer which material has a microstructure characterized by nodes interconnected by fibrils and a matrix tensile strength in at least one direction above about 9290 psi, and

***319** (b) a polymer impregnated within the pores of the said shaped article.

77. The structure of claim 35 in which the first shaped article is a sheet having pores that will pass a gas but will not pass liquid water.

FN1 35 U.S.C. §102(a) and (b) provide:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or * * *35 U.S.C. §103 provides:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.35 U.S.C. §112 provides:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

Davis, Circuit Judge, concurring in the result in part and dissenting in part.

I concur in the result on (1) the validity of the '390 patent under §§ 102-103; (2) the validity of the '390 patent under §112; (3) the invalidity of claims 1 and 17 of the '566 patent; (4) lack of fraud on the Patent and Trademark Office; and (5) denial of attorneys' fees. I disagree and dissent as to the validity of claims 3 and 19 of the '566 patent.

1. The process invention embodied in claim 1 of the '566 patent was known, through use of the 401

machine in the Gore shop, well before the "invention date" (claimed by Robert Gore, the inventor) of October 1969. [FN1] As such, the claimed invention was invalid on at least three grounds: (i) it was anticipated and therefore would have been obvious (under 35 U.S.C. §103) at the time of the claimed invention date; (ii) the invention was "in public use" by the Gore shop (under 35 U.S.C. §102(b)) more than one year prior to the patent application (i.e., prior to May 21, 1969); and (iii) the invention (made by Robert Gore) was known to and used "by others in this country" (35 U.S.C. § 102(a)) before the claimed invention date of October 1969, i.e. the invention was used by Wilbert Gore and others in the Gore shop before the October date. [FN2]

The critically important aspect of the invention of the '566 patent is the stretching of PTFE at a rate above 10% per second. [FN3] Robert Gore testified that he conceived this invention no earlier than October 1969 (and we have the right to take him at his word), [FN4] but the facts found by the District Court plainly show that the Gore shop was in fact practicing that invention considerably earlier.

The District Court found that in the 401 machine the distance between the stretch rollers controls the rate of stretch; a shorter distance results in a higher rate of stretch; for the process described in the '915 patent to be practiced with a rate of stretch *below* 10% per second, the distance between the stretch rollers would have to be greater than five feet; if the distance is less than four feet, the rate of stretch is greater than 10% per second; the machine drawings used to construct the 401 machine indicate that the distance between the stretch rollers was eight *inches*; a Gore employee testified that "I am reasonably sure that no effective [stretch] rolls in question would have been more than three feet simply because of the nature and size of the equipment" and that he did not remember any stretching more than three feet; another Gore employee testified that the distance between the rollers was "a maximum of 18 *inches*" (emphasis added); a document prepared by the same employee (an engineer) on June 10, 1969 reports that the stretch span was 8 *inches*; the 401 machine was the only stretching machine used by the Gore company; and the 401 machine was never substantially changed before October 1969. All this adds up to the fact that the 401 machine was at all relevant times operated with a stretch of less than four feet. [FN5] There is no question that the machine was so operated before October 1969 (the District Court found that sales of tape made by the 401 machine were proposed in August 1969).

I can accept Robert Gore's affidavit (to the PTO) that there was no stretching in the Gore shop at a rate exceeding about 10% per second prior to "my invention disclosed in the captioned patent application" (emphasis added) [FN6] only because that declaration was expressly qualified by the phrase "to my knowledge" (emphasis added). The District Court specifically found no specific intent by Robert Gore to defraud and, on this record, we *320 cannot properly overturn that finding. But the absence of personal intent to defraud does not mean or say that, whether Robert Gore realized it or not, the 401 machine was not actually operating, well before October 1969, to stretch unsintered PTFE at a rate exceeding about 10% per second. Cf. *O'Brien v. Westinghouse Electric Corp.*, 293 F.2d 1, 10 (3rd Cir. 1961). It seems impossible to me to reconcile Robert Gore's insistence on two facts-- that (i) he invented the process in October 1969 and (ii) he had no knowledge prior to October 1969 of stretching PTFE at the critical rate-- with the solid facts in the record as to the prior operation of the 401 machine, except on the view that Robert Gore did not realize that he and others in the Gore shop had made his invention previously.

2. It follows that in October 1969 the invention of '566 would have been obvious under §103 to Robert Gore because the prior practice of the 401 machine constituted prior art. Even if this was not prior art technically within §102, that statutory provision "is not the *only* source of prior art." In *re Fout*, 675 F.2d 297, 300 (CCPA 1982, emphasis in original). The 401 machine was practiced under the '915 patent (issued to Wilbert Gore) and, whether or not Robert Gore subjectively realized what was happening, he and others in the Gore shop were practicing the invention later embodied in the '566 patent. That was prior art at least as to Robert Gore. *Id.* at 300-01. [FN7]

3. If it be thought necessary to invoke §102 directly, in order to show anticipation, the record contains proof that the 401 machine was designed, constructed and used (just as described *supra*) in November and December 1968 and the early months of 1969--more than one year prior to the '566 patent application of May 21, 1970. See *Jt. App. E 1199-E 1200*. Section 102(b) therefore applies. Although commercial production was apparently not actively sought until June 1969, the practicing of the 401 machine prior to May 21, 1969 was "a public use" because the Gore company made "use of the device * * * in the factory in the regular course of business." *Connecticut Valley Enterprises, Inc. v. United States*, 348 F.2d 949, 952,

146 USPQ 404, 406 (Ct. Cl. 1965).

4. Also, §102(a) [FN8] applies here because Robert Gore was the inventor in the '566 patent and Wilbert Gore and others in the Gore shop were using the 401 machine before October 1969. Wilbert Gore (the inventor in the '915 patent under which the 401 machine was made and used) and the other employees are "others" within §102(a)--they are not the same as Robert Gore who claimed to be inventor of the process that ripened into the '566 patent. [FN9] See also § 102(f), which would bar Robert Gore if he did not himself invent the subject matter of the '566 patent. [FN10]

5. The majority sustains the validity of claims 3 and 19 of the '566 patent (the claims also involved in appellant's suit for infringement) which are dependent on invalid claim 1. Because of the invalidity of claim 1 the only possible novelty in claim 3 would be the requirement that the rate of stretch would be about 100% per second, and the possible novelty of claim 19 would be that the final length would be greater than about five times the original length. My position is that both of these added elements, if novel, would have been obvious to persons of ordinary skill in the art.

The defect in the majority's analysis is that it neglects the cardinal fact that the prior art included the 401 machine (discussed supra), not merely the earlier patents assessed in the majority opinion. The 401 machine directly involved PTFE itself, not conventional thermoplastic polymers. That machine also directly involved rapid stretching of PTFE at a rate markedly exceeding 10%. With this prior art of the 401 machine before him, an ordinary person skilled in the art would maximize stretch rate, if only to improve the machine's production rate. Cf. *In re Dwyer, Jewell, Johnson, McGrath, & Rubin*, 317 F.2d 203, 207, 137 USPQ 540 (CCPA 1963). Moreover, the very existence and operation of the 401 machine, which stretched PTFE rapidly without breaking, suggests to the skilled person the probability of stretching at even higher rates. Certainly, in the light of the 401 machine, skilled workers would see in at least *321 the prior Markwood, Nash, and Scarlett patents (teaching extensive and rapid stretching of non-PTFE thermoplastics) the suggestion that the method of the 401 machine could also be used for comparable rapid and extensive stretching of PTFE.

6. In sum, I cannot escape the conclusion that--although there was no fraud proved--if the true facts as to the 401 machine had been made known to the PTO

(as it requested), the involved claims of the '566 patent should (and probably would) not have been accepted.

FN1 The 401 machine was used under the prior '915 patent (issued to Wilbert Gore) which contains no reference to the significance of the rate of stretch.

FN2 Aside from the bases I discuss, I do not reach the other grounds asserted for invalidity of the '566 patent.

FN3 Before the PTO Robert Gore concededly referred to this as "critical" to his invention or as *his* "invention."

FN4 The District Court found that October 1969 was the earliest date Robert Gore asserts for his conception of the invention in the '566 patent.

FN5 The Gores (Robert and Wilbert) testified at trial that the distance was five feet but there is no indication that the trial court (which did not cite this testimony but did cite the opposing evidence) credited the Gores' testimony.

FN6 The factor of the rate of stretching was of direct interest to the examiner during the prosecution of the '566 patent. In response to the examiner's express request for a declaration that the Gore firm's production of stretched PTFE tape, prior to Robert Gore's invention asserted here, did not involve stretching of unsintered PTFE at a rate exceeding about 10% per second, Robert Gore filed an affidavit in the PTO specifically stating that "*to my knowledge*" (emphasis added) the 401 machine did *not* involve stretching at a rate exceeding about 10% per second.

FN7 The District Court has found that there are no differences between claim 1 of the '566 patent and the processes previously used by the Gore firm to produce paste-extruded unsintered PTFE.

FN8 An invention is anticipated if it "was known or used *by others* in this country * * * before the invention thereof by the applicant for patent" (emphasis added).

FN9 It is undisputed that it was Wilbert Gore who initiated the project for the 401 machine and watched over it.

FN10 The majority's discussion of "secondary considerations," though it is relevant to other aspects of this case, is irrelevant to the issue of anticipation raised by the 401 machine, and hardly persuasive as to the issues of obviousness based on or with respect to the 401 machine.

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